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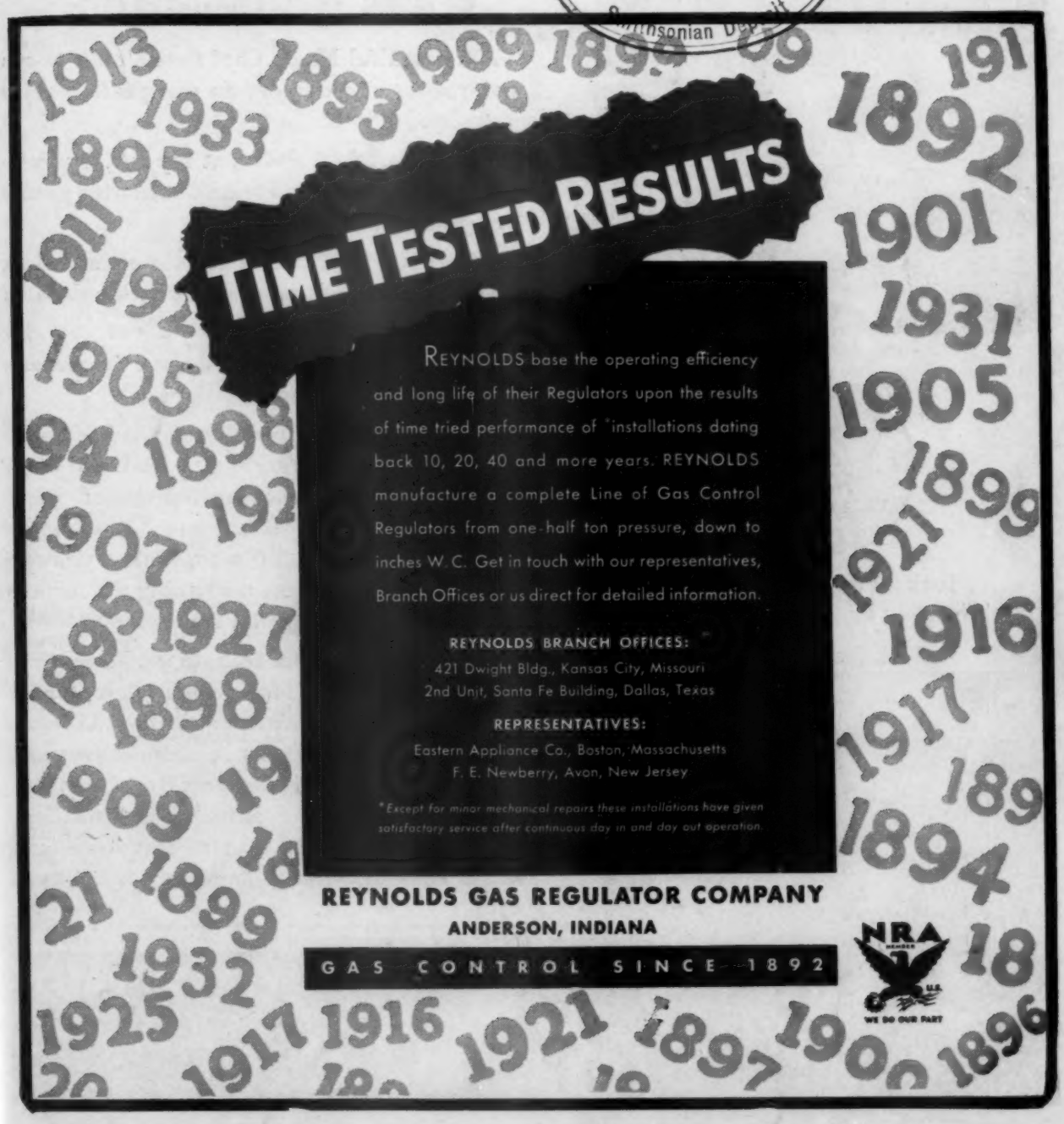
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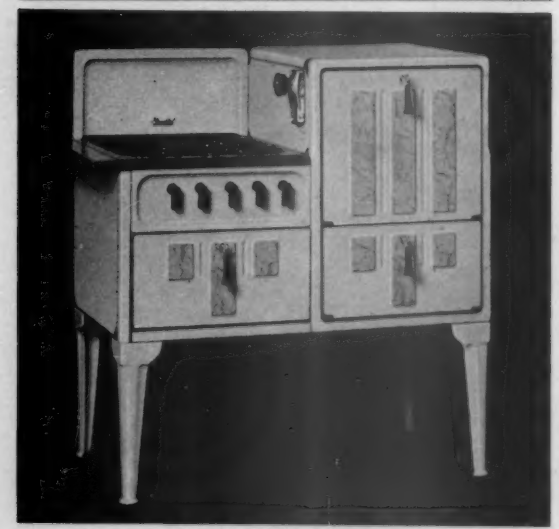

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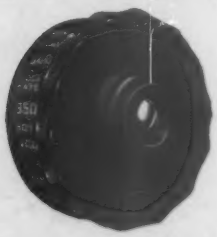

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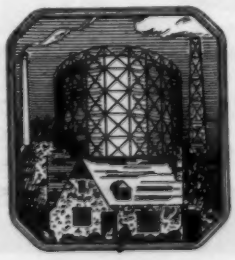

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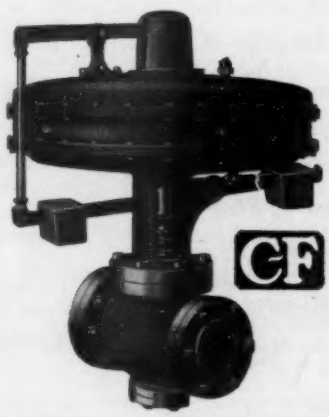

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Editorials

Gas and Housing

THE gas industry should be more than mildly interested in the activities and findings of the National Association for Better Housing during their recent meeting in Chicago. One of the items in their "five point housing plan"—"That steps be taken at once to institute a market study of the home building field, with a view to ascertaining in a thorough and scientific way the nature of the public's wishes as to the kind, type and location of homes desired"—should be of considerable significance to us.

It might be all very well for gas men to say that their field has nothing to do with the design of a house and its subsequent construction, figuring that comes exclusively within the province of the architect and contractor. But, as we have previously noted on this page, the most important services rendered a tenant are heat and comfort in winter, hot water for myriad household and personal needs, and the preservation and preparation of food to supply the inner man. We certainly figure vitally in carrying out these and other services where gas fits in so efficaciously, but most of us, short of home service employees, have as yet failed to realize that the general layout and, indeed, the very design of a home can have a profound effect on the degree of usefulness of gas service.

Granting the foregoing contention, it behooves all and sundry to become more familiar with housing conditions in their respective localities and to bear in mind that a home, regardless of its beauty in outside appearance, is literally not worth a tinker's damn if it cannot be lived in with a maximum of comfort from every angle.

Mr. Don A. Loftus, at this meeting, voiced disagreement with the findings of the government's group housing proposals, stating that "there will be one partition in a unit that is to be divided otherwise by curtains into what will amount to a five-room apartment. This unit will be heated by an old-fashioned burner for which the occupant will carry coal up the outside stairs.

"In order to save costs, there will be no heat in the bathroom, and one of the P. W. A. housing experts, after studying the heat effect of an electric light bulb placed in a chicken coop as an aid in hatching eggs, stated that the same electric light bulb would provide sufficient heat for these new bathrooms.

"These units are to have the old type four-legged bathtub, and they will not provide any of the usual utilities such as refrigerators or kitchen ranges."

If this gentleman's observations don't give us the shivers we have indeed little or no sense of proportion and the general fitness of things.

Finally, we rise to ask why, as far as we can ascertain, no out-and-out gas man—a home service worker, preferably—is noted in the activities of this recent conference of the National Association for Better Housing. The electric, oil and other fellows had a finger in the pie.

The Buxom Era

THOSE of us who can recall the periods of waiting in the barber shop of the nineties, intervals divided between a delightfully languorous inspection of the shelves of gaily decorated shaving mugs and a literally microscopic poring over the pages of the Police Gazette, might well view the Mae Westian furor as ushering us into the buxom era. If such a hegira be a fact, we of the old tonsorial parlor days can easily envision the contemporary breakfasts of hot cakes and sausages, the pans of delicious rolls, the barrel of oysters rolled creakingly into the cellar at Xmas time, and other gastronomic delights as coming into their own again.

Of a verity, the buxom era entails both more leisurely eating and old time eating. And such like repasts demand more liberal use of fuel, especially since the range oven is called into more frequent use. Moreover, if we read aright, that intriguing portrayer of our innards and their periodic cussedness, Dr. Logan Clendening, does not see many danger points in a Mae Westian revival. So, even though a renaissance of the pulchritudinous nineties might again make Saturday night bathing fashionable, we will perhaps gain an overall advantage by virtue of the cooking appliance doing the yeoman service required.

Here and There

THE manner in which the Denver gas company went about the task of supplying gas to its customers during a break in the pipe line from Amarillo in September calls for commendation of a high order. Here was enacted drama quite reminiscent of "Jim Bludsoe" and "While London Sleeps."

The gas industry has ever been able to meet the most exacting service requirements since its beginning in the early years of the last century, and assuredly the good work accomplished during the Denver pipe line break constitutes a quite ponderable agency for promoting good will.

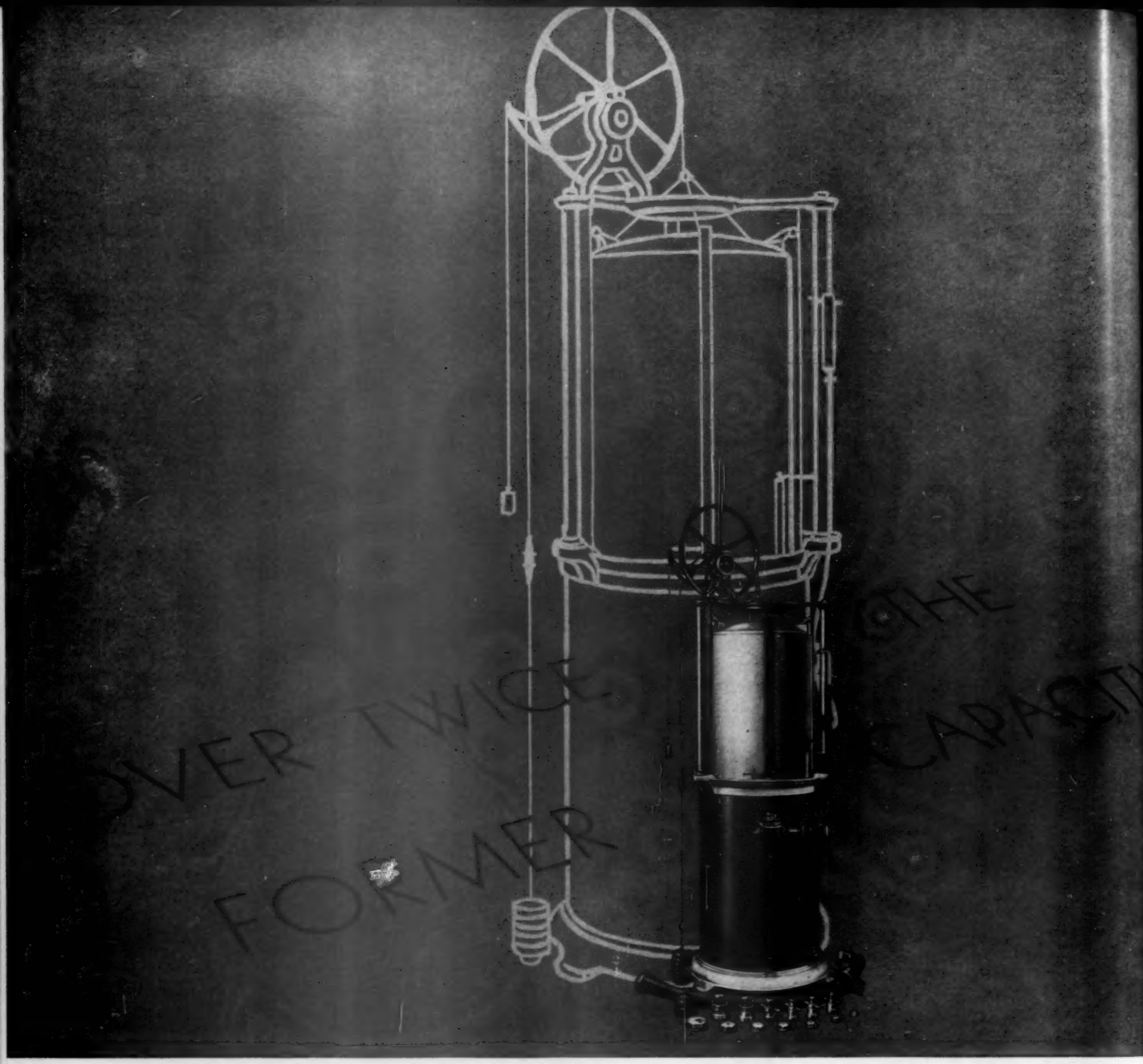
****

Results of recent elections throughout the country wherein municipal control of utilities was an issue, should serve to warn us that continuance of franchises under private management can only be guaranteed by eternal vigilance, to the end that our customers can at all times count on satisfactory service in its broadest sense.

Henry M. Riley

Editor

NOV 17 1933



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AMERICAN GAS JOURNAL
November
1933

The Performance of Thermostats on Gas Appliances

By HARRY W. SMITH, JR.

A. G. A. Testing Laboratory

Fig. 1—View Showing Some of the Test Equipment Used in Research on Thermostats at the American Gas Association Testing Laboratory.

AMONG the many types of automatic appliance control accessories now used on domestic gas appliances none have proved more valuable in popularizing the use of gas for cooking and heating purposes than temperature regulators or thermostats. By means of devices of this nature the rate of heat input to range ovens, rooms, or tanks of stored water is automatically controlled by the temperature of the space or water being heated. Thus, temperatures may be automatically held constant or permitted to vary within fixed limits at the will of persons using an appliance properly equipped with thermostatic gas control.

Thermostats are made by many different manufacturers and the market is replete with different types and designs; yet the standards of their manufacture are high and their performance is, in practically all cases, reasonably accurate and satisfactory. Notwithstanding these facts, the different types vary greatly with respect to (1) construction, (2) principles of design, (3) operating characteristics, (4) capacity, and (5) manner of application. Great care must, therefore, be exercised in purchasing such a temperature control unit in order to select the proper thermostat to give the regulation desired. Wisdom of judgment in this matter may only arise from a comprehensive knowledge of the operating characteristics of thermostats, an understanding of the manner in which their use affects appliance performance, and an appreciation of the degree to which thermostatic control is dependent upon the features of appliance design and construction.

It is hoped that the material presented below, which is based upon the results of a recent investigation by the American Gas Association Testing Laboratory of some 58 gas range, water heater, and space heater thermostats, will assist purchasers of such accessories in selecting attachments properly adapted to the service expected of them on the appliances with which they are to be used. Too often is unsatisfactory appliance operation wrongfully attributed to a thermostat of high quality where in fact the source of trouble may actually lie in a faulty or incorrect application of the thermostat to the appliance, or in the use of thermostatic units designed for an entirely different duty or another type or size of appliance. All this can be avoided if the special purposes and capabilities of different types of thermostatic gas controls are appreciated.

Every thermostat operates on the principle of differential thermal expansion and consists of four main parts: namely, (1) the thermal element, (2) the linkage, (3) the gas control element or valve, and (4) the adjustment feature. The thermal element is made up of two materials, having different coefficients of expansion, so arranged that temperature changes result in effective increases or decreases in the length, area or volume of one of the components with respect to the other. The motion thus provided serves to actuate the valve or gas control and is transmitted to that unit by means of the linkage, a mechanical or hydraulic connecting mechanism. A valve and seat assembly together with appropriate inlet and outlet gas connections constitutes the gas control element. Finally, by means of the adjustment feature the relative placement of, or forces acting upon, various parts of the thermostat may be adjusted in such a manner that the critical operating temperatures of the device may be regulated within certain limits.

The several parts of different thermostats vary widely in principle and design. Low expansion rods (usually carbon, porcelain or invar) enclosed within relatively high expansion tubes (usually copper or brass), liquid-filled bombs or cells, bimetallic strips, discs or coils, and bellows containing liquids or gases are the most frequently used varieties of thermal elements. Linkage may be accomplished through either direct connections, butt compression contacts, ties, yokes, lever systems, spring trips, liquid columns within semi-rigid tubing, shafts, universal joints, or combinations thereof. The gas control element is subject to the usual variations of gas valve design. Some thermostats are provided with a fixed or adjustable by-pass in the valve body, which permits a definite amount of gas to shunt around the valve and reach the burner of the appliance independently of the thermostat proper. Adjustment of thermostats is customarily afforded by calibrated dials, drums, pointers or levers, or by uncalibrated adjustment screws or pins. In view of the above, it is quite obvious that great divergence exists in thermostat design, and that the characteristics of operation of any particular thermostat are primarily governed by the particular constructional features it incorporates.

Classification of Thermostats

Thermostats are ordinarily classified into two general types from the standpoint of their operational characteristics: namely, (1) graduating or throttling thermostats, and (2) snap acting thermostats. Each type, of course, is subject to variations of many sorts, but, in the main, the two are easily delineated.

However, before discussing the characteristic features and performance of each of these two types of thermostats, certain general observations need be made. At any given adjustment and inlet gas pressure the maximum gas passing capacity of a thermostat naturally occurs when the thermal element is sufficiently cold to permit the gas control valve to assume the wide open position. The maximum thermal element temperature at which this condition obtains is known as the "base" temperature. The minimum gas passing capacity of a thermostat (which is zero if no by-pass is provided), occurs, on the other hand, when the thermal element is sufficiently hot to hold the valve in the completely closed position. The minimum temperature of the thermal element at which the valve is thus totally shut is known as the "adjustment" temperature. At temperatures below this point the valve opens to a degree dependent upon the temperature of the thermal element and the design of a thermostat, permitting gas to reach the appliance. The difference in the performance of the two classes of thermostats listed above hinges upon the character of the relationship between the gas valve opening and the proximity of the thermal element temperature to the adjustment temperature, i.e., upon the manner of variation of gas passing capacity with thermal element temperature.

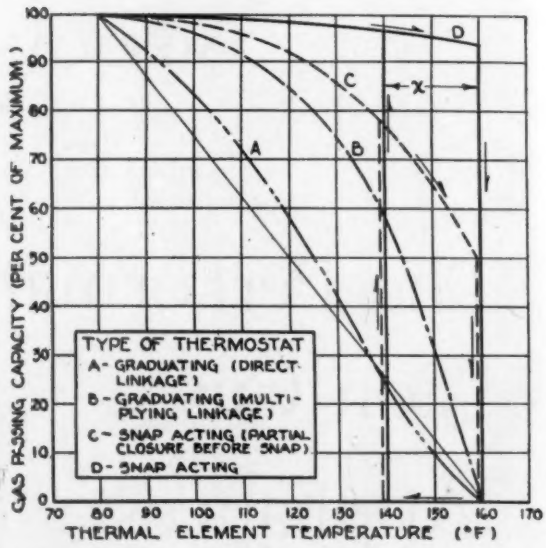


Fig. 2—Representative Characteristic Curves for Various Water Heater Thermostats

A graduating thermostat is defined as one in which the motion of the valve disc of the gas control element with respect to its seat is *proportional* to the gradual effective motion of the thermal element brought about by temperature changes. Thus, the throttling of the gas supply to appliances upon which graduating thermostats are installed must always be gradual and progressively increasing as the temperature of the thermal element rises toward the point of adjustment, the point at which the gas valve is completely shut. Despite this common operational characteristic of all graduating type devices, considerable variation in the manner in which throttling occurs with increasing thermal element temperature may be secured, depending upon the type of linkage employed.

In many graduating type thermostatic gas valves, the motion of the valve disc toward its seat is *exactly equivalent* to the gradual effective motion of the thermal element. For example, if the unanchored end of the carbon rod, in a graduating rod-and-tube thermostat of this type, moves 0.05 inch with respect to its sheath, the valve must close (or open) 0.05 inch. This condition may be occasioned by using direct connections, ties, or compression contacts for linkage and thermal elements whose effective movement is purely the result of differential expansion. The distinguishing feature of performance of such graduating thermostats is that the rate of flow of gas through them is decreased from the maximum amount (occurring at the base temperature when the thermal element is wide open) to zero (occurring at the adjustment temperature when the valve is completely closed) in nearly direct proportion to the increase of thermal element temperature from the base toward the adjustment temperature. A representative capacity characteristic for such a type of graduating water heater thermostat is illustrated by curve A of Figure 2 in which 80 degrees Fahrenheit is the base temperature and 160 degrees the adjustment.

Using Multiplying Levers

In other graduating type thermostatic gas valves, the motion of the valve disc toward its seat is proportional to but *greater than* the gradual effective motion of the thermal element. This effect may be accomplished by employing multiplying lever systems for linkage together with thermal elements whose effective movement is purely the result of differential expansion. A representative capacity characteristic curve for such a device is illustrated by curve B of Figure 2. It will be noted

that the temperature of the thermal element may be increased considerably from the base temperature (80 degrees Fahrenheit) before any appreciable throttling of gas occurs, although the motion of the valve disc toward its seat is uniform throughout the range of 80 to 160 degrees Fahrenheit thermal element temperature. Near the adjustment temperature (160 degrees Fahrenheit), however, throttling is quite rapid. Such performance is a direct consequence of the comparatively great distance between valve disc and seat when graduating thermostats with multiplying linkages are wide open, for under such circumstances the valve disc must be made to move quite some distance before it approaches its seat sufficiently closely to offer appreciable resistance to the flow of gas.

Need for By-Pass

Graduating thermostats of either type listed above have their particular advantages and shortcomings. A gas by-pass either integrally incorporated in the device or separate from it, must ordinarily be employed with a graduating thermostat in order that a minimum quantity of gas be supplied to the burner of the appliance at all times. Otherwise, as the temperature of the medium being heated, and hence, of the thermal element immersed therein, approaches the adjustment point, the gas rate might decrease to the point at which dangers of flash-back, extinction, escape of raw gas and explosion are imminent. A base or minimum flame fed from a by-pass line, however, forestalls this situation. This by-pass input must, furthermore, be less than that required to create without assistance the lowest temperature of heated medium expected to lie in the range of regulation.

As a direct result of the nature of their capacity-temperature characteristics, curves A and B of Figure 2, graduating thermostats foster a very definite type of temperature control, typified by the temperature regulation curves, A and B, of Figure 3. The four exaggerated theoretical curves of Figure 3 are drawn to assist in visualizing the points of divergence between the temperature regulating properties of the four thermostats for which capacity characteristics are given in Figure 2. In these curves, the temperature of the heated medium surrounding the thermal element is plotted vertically against time, for a theoretical appliance operating in turn with the various thermostatic gas controls. The horizontal line, in each case, represents the adjustment temperature; the near vertical drop at "a" an instantaneous, externally caused, decrease in medium temperature intended to simulate a very rapid, large, draw of hot water or the opening of an oven door.

It will be noted that graduating thermostats generally hold temperatures either constant or within very close limits, for the gas supply is finely modulated by the medium temperature. That is, if the temperature falls slightly the input is elevated slightly; if the temperature rises slightly the input is correspondingly diminished slightly. As a result of this very property, however, the temperature "recovery time," i.e., the time required to build up the medium temperature to the adjustment point from a relatively cold start is considerably longer for graduating than for other types of thermostats under similar circumstances, since for any thermal element temperature above the base and below the adjustment temperature, the input to an appliance when equipped with a graduating thermostat is less than that to the same appliance when equipped with a corresponding snap acting device (see Figure 2). "Overshoot" may occur with graduating thermostats when the medium is heated rapidly and the rate of heat transfer from the medium to the thermal element is relatively low. In other words, the temperature of the medium during heating periods may be noticeably higher than the temperature of the thermal element. For obvious reasons this phenomenon is usually observed on range oven thermostats, but rarely noted with water heater controls.

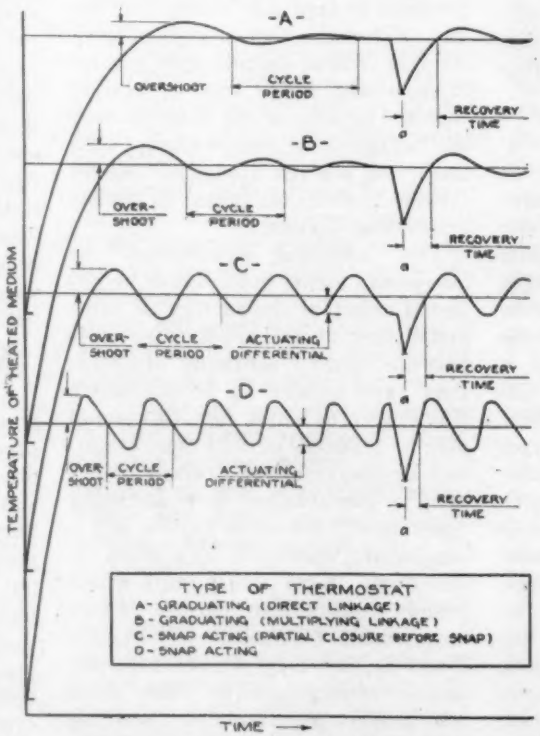


Fig. 3—Theoretical Temperature Regulation Curves for Various Thermostats on a Hypothetical Appliance.

Operating Characteristics

Graduating thermostats employing multiplying lever systems for linkage (B in Figures 2 and 3) regulate temperatures in much the same manner as do graduating types employing direct linkage systems (A in Figures 2 and 3). However, inasmuch as the gas rate to appliances increases more rapidly with falling temperature when multiplying lever devices are employed (the right hand portion of curve B, Figure 2, is steeper than the corresponding portion of curve A in the same figure), the "period of cycling" and "recovery time" are shorter and the "overshoot" is greater. With both multiplying linkage and direct linkage types of graduating thermostats it must be remembered that "cycling" and "overshoot" need not occur at all, even, as shown in Figure 3, during the heating-up periods or after draws, if the rate of heating as the adjustment temperature is reached is sufficiently reduced to insure a negligible temperature difference between the medium being heated and the thermal element.

In snap acting thermostats as opposed to graduating types the thermal element is either so constructed within itself or so linked to the gas

valve that gas is permitted to flow through the device at almost its maximum rate as the thermal element's temperature rises until a definite "cut-off" or adjustment temperature is reached. At this point the gas valve snaps instantly into a closed position and the gas supply to the appliance is completely shut off. Ordinarily this behavior is the result of utilizing flexed bimetallic discs for thermal elements or spring trips or special mechanisms for linkage, so that a slow, gradual and ineffectively throttling motion of the valve (or none at all) is obtained until a position of "dead center" or "force balance" is just passed by the trip or disc, at which time the valve is instantaneously snapped shut the remainder of the way. After the heat input to the appliance has been thus shut off the temperature of the thermal element, of course, tends to fall. In time this temperature will recede to a "cut-on" point at which time the thermostat opens almost fully and heating is resumed at an appreciable rate. The difference in temperature between the higher "cut-off" or adjustment temperature and the lower "cut-on" temperature is known as the "actuating differential." Curves C and D in Figure 2 illustrate representative gas passing capacity versus thermal element temperature relationships for snap acting units. For the curve D the distance "x" represents the "actuating differential."

Gradual Gas Throttling

Depending upon the details of thermal element, linkage, and valve design, a snap acting thermostatic gas valve may be caused to close gradually and throttle the gas throughput by either a negligible or a considerable amount before the snap occurs and the gas supply is completely shut off. In many instances, minor dimensional differences only distinguish the two types of snap acting controls. It is significant to note that with thermostat D, Figure 2, only 6 per cent of the maximum throughput of the thermostat was lost as the thermal element temperature was elevated prior to the instantaneous closure or snap occurring at 160 degrees Fahrenheit. On the other hand, with thermostat C, Figure 2, 50 per cent of the valve's capacity was lost as the temperature rose before complete closure instantaneously occurred at a "cut-off" temperature of 159 degrees Fahrenheit. The advantages of each type will be apparent when their temperature regulating characteristics are discussed.

Although snap acting thermostats do not require minimum by-pass flames as do graduating thermostats, they do require that constant burning pilots be employed, for the gas supply in snap acting systems is at any time either completely shut off or well on, and means of ignition are, therefore, required at appliance burner ports whenever snap acting thermostatic valves open.

Cycling Aspects

Snap acting thermostats are fundamentally cycling controls. The gas to the appliance burner is either completely shut off or well on, and therefore, heating, when it occurs, is very rapid. Consequently "cycling periods" and "recovery times" are short in relation to the same indices for graduating thermostats. Further, it will be observed at once from Figure 3 and a consideration of the manner in which graduating and snap acting thermostats operate that snap acting controls (C and D) yield continually cycling medium temperature charts, whereas graduating controls (A and B) permit the medium temperature to approach slowly and finally reach and maintain a given level. Also, in view of the markedly greater capacity and, hence, rate of heating fostered by snap acting controls near the adjustment temperature, such units, for a given appliance, exhibit greater "overshoots" than do similar graduating devices.

The "actuating differentials" of many snap acting devices may be adjusted either at the factory or after installation, and where such action is possible small "actuating differentials" are usually to be preferred. The degree to which this differential may be reduced, nevertheless, is limited by the resultant "period of cycling"; the smaller the "actuating differential," the more rapidly will a snap acting unit cycle on a given installation. Snap acting units which permit considerable closure before snap occurs (thermostat C, Figures 2 and 3), however, possess naturally longer cycling periods than those which effect practically no throttling prior to the snap closure (thermostat D, Figures 2 and 3) inasmuch as their capacities are less near the adjustment temperature. Therefore, for a given "cycling period" the former type of snap acting control permits smaller "actuating differentials" than does the latter type, or for a given "actuating differential" permits longer "cycling periods."

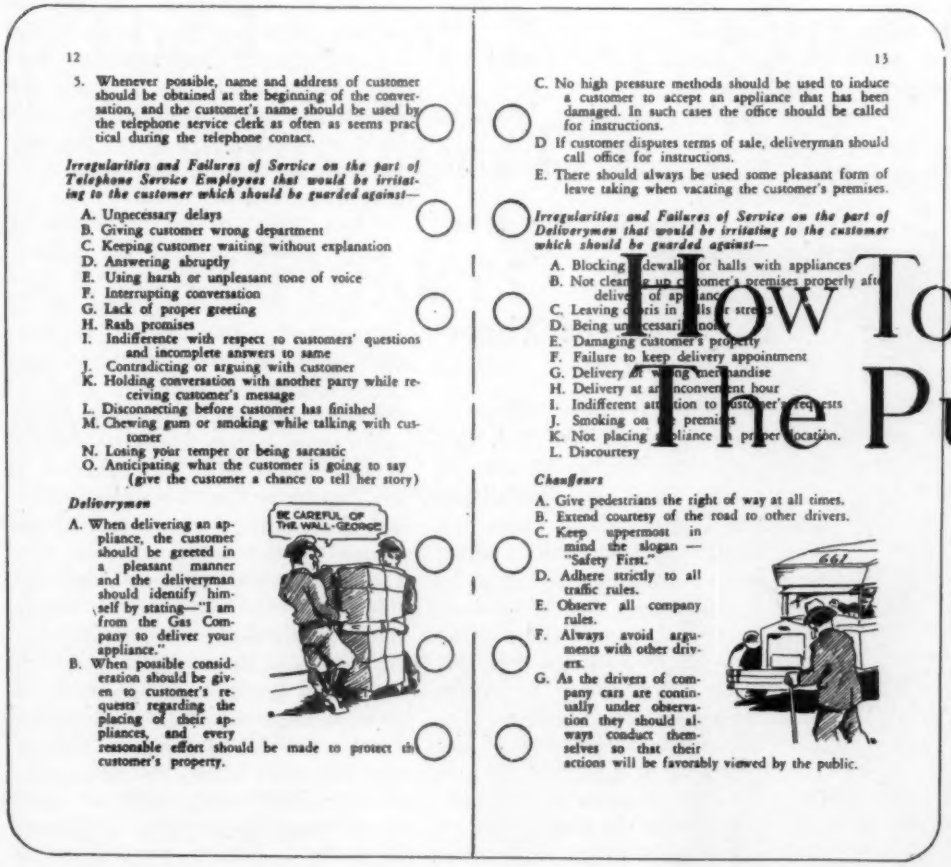
When thermostats are selected for installation on gas appliances it is not sufficient, however, merely to choose the correct class of accessory from the standpoint of the type of capacity characteristic and temperature regulation desired. The manner of installation of the thermostat and the operating characteristics of the appliance are of equal, if not more, importance since these factors vitally influence thermostat performance. Some of the more important items to be remembered will be mentioned below.

Graduating thermostats are generally chosen to control room temperatures and gas range oven temperatures inasmuch as most present day snap acting thermostats permit, wherever gaseous media surround their thermal elements, excessive temperature fluctuations as a result of "overshoot," "actuating differential," and the unrestricted firing occurring whenever snap acting thermostatic valves are open. If, however, snap acting thermostats can be devised which surmount these difficulties and are, therefore, adaptable to range ovens, wider latitudes of temperature regulation than now attainable may be secured, since range ovens (especially insulated ovens) equipped with graduating thermostats, are sometimes difficult to maintain at very low temperatures because of the necessity of maintaining stable by-pass flames on the burners at all times.

Application to Water Heaters

On water heating equipment all types of thermostats are effectively used. Nevertheless, it is extremely difficult to apply graduating thermostats to water heaters employing burners having a large number of ports, since the required by-pass input in such cases must, in order to yield stable flames, usually be larger than that permissible during standby. Graduating thermostats may ordinarily be successfully used, however, with water heaters which employ jet type burners. Snap acting

(Continued on page 12)



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5. Whenever possible, name and address of customer should be obtained at the beginning of the conversation, and the customer's name should be used by the telephone service clerk as often as seems practical during the telephone contact.

Irregularities and Failures of Service on the part of Telephone Service Employees that would be irritating to the customer which should be guarded against—

A. Unnecessary delays
B. Giving customer wrong department
C. Keeping customer waiting without explanation
D. Answering abruptly
E. Using harsh or unpleasant tone of voice
F. Interrupting conversation
G. Lack of proper greeting
H. Rash promises
I. Indifference with respect to customers' questions and incomplete answers to same
J. Contradicting or arguing with customer
K. Holding conversation with another party while receiving customer's message
L. Disconnecting before customer has finished
M. Chewing gum or smoking while talking with customer
N. Losing your temper or being sarcastic
O. Anticipating what the customer is going to say (give the customer a chance to tell her story)

Deliverymen

A. When delivering an appliance, the customer should be greeted in a pleasant manner and the deliveryman should identify himself by stating—"I am from the Gas Company to deliver your appliance."

B. When possible consideration should be given to customer's requests regarding the placing of their appliances, and every reasonable effort should be made to protect the customer's property.

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C. No high pressure methods should be used to induce a customer to accept an appliance that has been damaged. In such cases the office should be called for instructions.
D If customer disputes terms of sale, deliveryman should call office for instructions.
E. There should always be used some pleasant form of leave taking when vacating the customer's premises.

Irregularities and Failures of Service on the part of Deliverymen that would be irritating to the customer which should be guarded against—

A. Blocking sidewalk for halls with appliances
B. Not cleaning up customer's premises properly after delivery of appliance
C. Leaving debris in halls or streets
D. Being unnecessarily noisy
E. Damaging customer's property
F. Failure to keep delivery appointment
G. Delivery of wrong merchandise
H. Delivery at an inconvenient hour
I. Indifferent attention to customer's requests
J. Smoking on the premises
K. Not placing appliance in proper location.
L. Discourtesy

Chauffeurs

A. Give pedestrians the right of way at all times.
B. Extend courtesy of the road to other drivers.
C. Keep uppermost in mind the slogan — "Safety First."
D. Adhere strictly to all traffic rules.
E. Observe all company rules.
F. Always avoid arguments with other drivers.
G. As the drivers of company cars are continually under observation they should always conduct themselves so that their actions will be favorably viewed by the public.

How To Meet The Public—

EMPLOYEES of the Consolidated Gas Company of New York have prepared their own rules and regulations on the important subject of "How to Meet the Public." The result is a twenty-page guide, 3¾ x 6¾ inches, on customer contacts.

The practices and principles contained in this booklet represent the majority opinions of more than 2300 employees whose duties bring them in direct daily touch with customers.

The guide is a direct by-product of the Contact Training Program, conducted as a regular activity under the direction of the Public Contact Division. Questionnaires were prepared on specific contact problems which arise when dealing with the public, and also on the proper employee attitude under varying circumstances.

The questions were discussed in detail at the monthly group conferences which the contact employees attend, and the reactions and answers of the employees were then gathered and summarized into the smallest possible number of clear cut rules and recommendations.

The contact procedure outlined in the booklet has been unanimously approved by the executives of the company, according to Frank L. Hallock, Director of the Public Contact Division.

"Practice what we preach is our motto," Mr. Hallock said. "If we put into practice the methods decided upon in the group conferences which now appear in abbreviated form in the booklet, it should not be difficult for any contact employee to handle trying situations, explain rules that are not readily understood by the customer, and adhere to certain required procedure and routine that to the customer may seem complicated, unreasonable or unnecessary.

"Sincere and persistent application by all contact employees of the standard practice as agreed upon will create a pleasing atmosphere everywhere and strengthen the relations existing between company and the customer."

The purpose of the guide is twofold, Mr. Hallock explained. It should serve as a constant reminder to all experienced employees of the need for and the importance of uniform application of common sense contact principles. It will also be an easily understood guide for any new employee who may be assigned to a contact position.

It starts with several quotations from speeches by Geo. B. Cortelyou, President of the Company, on the importance of human relations. The contact practice is divided into the following job classifications:

Floor sales clerks, district salesmen, office service clerks, telephone service clerks, deliverymen chauffeurs, fitters and appliance maintenance men, meter indexers, collectors, credit clerks, cashiers, and district and office investigators.

Under each of these headings are given two types of specific information. The first concerns the recommended practice for all, and the second lists the specific faults which should be guarded against—such as those irregularities and failures of service which might prove irritating to customers.

For instance, the recommended practice for fitters and appliance maintenance men is as follows:

"1. The fitter, or appliance maintenance man, should greet the customer with a pleasant 'Good Morning' or 'Good Afternoon' — and identify himself by saying, 'Service Man—from the Gas Company.'

"2. Special care should be given to personal appearance. Keep uniform as neat and clean as possible. Be clean shaven, and have shoes polished. A good personal appearance aids in making a good customer contact.

"3. While on the customer's prem-

ises, the service man should always conduct himself in a courteous business like and efficient manner and special consideration should be given to the following:

"A. Careful speech.

"B. No unnecessary remarks.

"C. Refrain from smoking.

"D. Customer's question and requests.

"E. Care of customer's property.

"4. Remove hat when entering home or office or when speaking to a woman.

"5. All questions asked by the customer should be answered as accurately as possible, and if employee is not sufficiently informed to provide the desired information, he should either refer the customer to the proper department or secure the information personally for the customer.

"6. All customer service employees should be thoroughly familiar with the rules and regulations of their own and related departments, and how to courteously and intelligently explain their purpose to the customer when necessary.

"7. When a job is completed an effort should be made to ascertain whether or not the customer is satisfied. Be sure premises are left in as good or better condition than found. When leaving do not neglect to use some pleasant form of leave taking.

"8. If called to a customer's premises to remedy a condition which customer claims was not attended to properly by another employee, refrain from knocking or criticizing."

Then the following points are listed as irregularities and failures of service which should be guarded against:

"1. Failure to keep appointments.

"2. Poor or careless workmanship.

"3. Leaving premises dirty.

"4. Not to complete job on first call.

"5. Lack of knowledge of work.

"6. Damaging customer's property.

"7. Rough talk or improper language.

"8. Too noisy.

"9. Abrupt or flippant answers.

"10. Unpleasant or improper greeting.

"11. Smoking on premises.

"12. Failing to report customer's request.

"13. Tracking dirt or mud into the premises.

"14. Not returning borrowed keys.

"15. Condemning appliances unnecessarily.

"16. Leaving job without testing appliances."

Performance of Thermostats

(Continued from page 10)

thermostats, on the other hand, may generally be applied to any type of water heater, since "overshoots" and "actuating differentials" are not large enough in such cases, where the heated medium is a liquid, to be objectionable. As a matter of fact, the recovery capacity of snap acting control systems is so large that frequently their application to water heating is a distinct advantage.

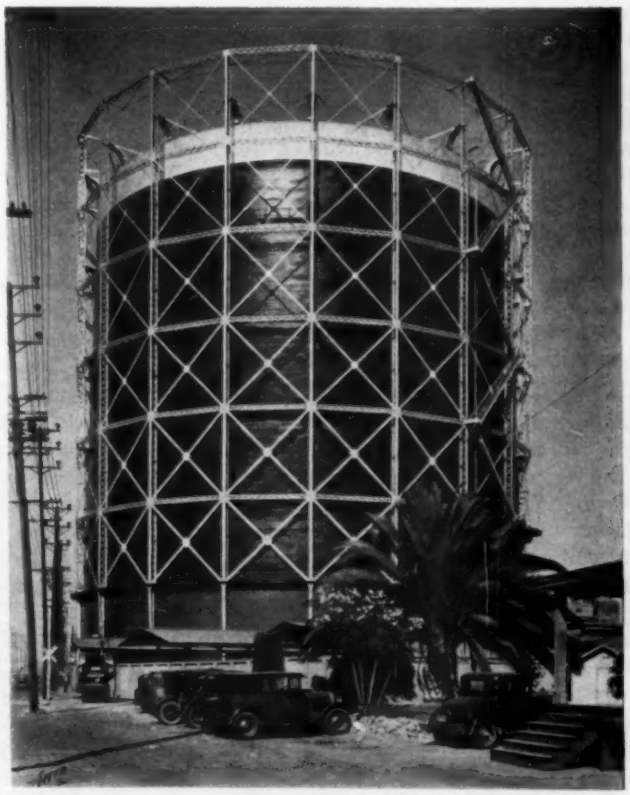
The placement or location of the thermal element of a thermostat in a gas range oven, a water heater storage vessel, or the circulating line of a hot water supply system determines to a great extent the sensitivity and accuracy of temperature control which may be expected. If the temperature of the medium immediately surrounding the thermal element of a gas range thermostat, for example, is neither equal to, nor proportional to, the average temperature of the oven throughout the temperature range over which regulation is desired, it is quite probable that unsatisfactory temperature control will result. Similarly, if the thermal element of a water heater thermostat is so located that the temperature of the water surrounding it differs materially from the average tank water temperature especially if not in proportion to it, poor regulation is also likely to occur. It is, of course, possible to calibrate the adjustment feature of any thermostat so that, for one certain manner of installation on a given appliance, satisfactory temperature control may be secured. However, such action does not assure satisfactory thermostat operation for any other mode of installation, for any other condition of circulation of heated medium in the heating or storage vessel, or for any other appliance.

Another matter of importance in thermostat installation concerns the degree to which the valve bodies and linkages of thermostats are subject to heating. In general, the higher the temperature of the valve body and linkage the lower the temperature at the thermal element required to produce closure.

The ability of a thermostat to render satisfactory service depends also to a considerable extent upon the precision and ruggedness of its design and construction. A brief discussion of such factors may, therefore, be of interest. Each of the 30 water heater, 24 gas range, and 4 space heater thermostats tested in connection with the research at the American Gas Association Testing Laboratory mentioned above, showed workmanship and design of a distinctly high caliber. Appreciable leakage of gas either to the atmosphere through valve bodies or to burners past thermostatic valves in the closed position, rarely occurred. Any leakage which was observed could usually be stopped by tightening pipe or screw threads, using suitable joint compounds, or some other simple procedure. Calibrated adjustment features were found to indicate closely the temperature of the thermal element for all the devices tested except those on which calibrations were manifestly made to indicate medium temperatures for one particular manner of installation on one particular appliance. Furthermore, after long periods of continued operation none of the 58 thermostats showed appreciable signs of deterioration. Life tests in which each snap acting thermostat was made to cycle 100,000 times and each graduating thermostat was made to respond to a closing temperature from a relatively cold start at least 50,000 times, were applied and the devices subsequently tested. Most present day thermostatic gas controls are of high quality and, for the uses to which they are adapted, serve valuable purposes. However, scrupulous care must be exercised, whenever precise temperature control is desired, to (1) select the proper type and size of thermostat for the appliance to be equipped, and the kind of temperature regulation required, (2) install the thermostat in the proper manner, and (3) investigate the effect of the thermostat's characteristics on appliance operation.

The Use of Non-Drying Oils and Paints for The *Protection* of Gas Holders

By
GAS HOLDER MAINTENANCE SUB-COMMITTEE
Pacific Coast Gas Assn., Thos. N. Kellett, Chairman



Showing the 5-million cu. ft. holder of the Los Angeles Gas and Electric Corporation located in Los Angeles. This holder is treated with Calol Holder Oil and the treatment has shown excellent results both as to appearance and protection.

I—Causes for Gas Holder Corrosion

HOLDER corrosion due to the action of water, oxygen and carbon dioxide on metal is the source of a great deal of annoyance and expense. When iron and water are in contact a chemical reaction takes place forming iron hydroxide and hydrogen, which are slightly soluble in water. The presence of oxygen in the water causes a reaction between the iron hydroxide to form the insoluble or more stable ferric hydroxide.

When the lifts are lowered into the pit water, several things happen which affect these chemical reactions—oxygen is carried into the water, the hydrogen film may be disturbed, the water in the immediate vicinity of the iron is mixed up so as to bring new water unsaturated with the soluble iron hydroxide in contact with the iron, and the precipitated insoluble iron hydroxide is stirred up. When the lifts are raised a certain amount of water saturated with ferrous hydroxide clings to the sheets. The ferrous hydroxide reacts with the water from the pit and oxygen from the air, to form ferric hydroxide. The lifts will then be streaked with rust and be unsightly, even though they may be perfectly protected by a good coat of paint.

Many attempts have been made to prevent this precipitation of iron hydroxide. It is possible to partially accomplish this result through the use of chemicals. However, this treatment is so costly that for practical purposes it must be set aside as impractical.

II—The Use of Paints for Holder Protection

In order to preserve the holder structure against corrosion, it has been common practice for many years to use various forms of paints applied on the surface of the cleaned metal. By various color combinations it has likewise been possible to have the holders present a good appearance and thereby conceal a large part of their unsightly massiveness.

Many different kinds of primers and finish coats have been developed in the paint line, many of which have rendered satisfactory service. It is not the purpose of this article to enter into the discussion of the relative merits of the various paint products on the market.

Until recent years it has been the policy of nearly all gas utilities to protect the entire outer surface of their holders with some form of paint. The practice of the Los Angeles Gas and Electric Corporation in regards to paint application on a new holder has been to apply first, a thin coat of red or white lead. This material is allowed to dry thoroughly. A second coat of red or white lead is then applied, the consistency of this coat is somewhat heavier than the first application. After thoroughly drying out the surface is then ready for the final or finish coat.

Formerly, a green graphite paint was used for many years with very good lasting qualities. During the past few years, however, we have been using aluminum paint on all the crowns, frame work and stairs. On the holder pit however, we are still using green graphite paint.

Our experience has been that the above applications render a good protection and likewise present an attractive appearance. For many

Read before Pacific Coast Gas Ass'n. Convention, Los Angeles, Cal., Sept. 13-15, 1933.

years we painted the lifts of our holders in the same manner, that is, two coats of primer and one coat of green graphite paint for a finish coat. While this rendered a good protection for the metal, it was found that the constant cupping and uncupping of the various holder lifts, due to the water in the pit, caused a film to be formed over the paint on the various lifts. While the paint itself was not injured to any great extent, nevertheless it presented an unsightly appearance. For this reason and also for the fact that the cups of the holders and dam sheets were subject to corrosion, it was deemed advisable to experiment with various forms of oil as a protection for the lifts and cups.

III—Bituminous Materials as a Protection Against Corrosion

The use of non-drying oils for the protection of the lifts and cups of gas storage holders has been rapidly gaining favor among gas utilities during the past few years. The added protection to the cups and dam sheets as well as the lifts themselves, as well as the better holder appearance rendered by the use of non-drying oils have been important factors in this rapid change-over.

The use of oil or asphaltum, a product produced from nature's own oil seepages, as a preservative is as old as history itself. The first use of a bituminous oil in a water sealed holder, to the writer's knowledge, occurred in 1905 and no doubt in some cases dates back much longer than that. It has only been during the last fifteen years, however, that the gas industry, realizing the extent to which corrosion was going on in the various large storage holders, deemed it necessary to investigate the possibility of using products other than paints for protection against corrosion.

Various forms of oils and tar products have been used during the past few years, with apparently beneficial success. In 1922, various concerns appreciating the business opportunities existing, started the manufacture of various non-drying oils for use on lifts and cups of water-sealed storage holders. At the present time there are four major products in use for holder protection: compounded fuel oils and lubricating oils, Calol Gas Holder Oil No. 2, No-Oxid Holder Seal and Imunol Holder Oil. All of these products have been in use for some time and all seem to give satisfactory service. Many instances could be stated where the use of non-drying oils has greatly reduced the corrosion and likewise improved the outward appearance of the structures.

An interesting experience in connection with two 1 million cubic feet capacity holders of the Los Angeles Gas and Electric Corporation clearly demonstrates the results of the use of holder oil as a protecting medium against corrosion. Some years ago these holders were dismantled and moved to a new location in Pasadena and rebuilt. Within six years of this rebuilding, it was found that all the cups and dam sheets had to be replaced, which necessitated the bottoming of the holders, purging and necessary repairs, at a cost of several thousand dollars. After the holders were properly repaired and inflated a non-drying oil was applied. These holders have since been in service some eight years, with no pitting or rusting whatsoever to the lifts, cups or dam sheets.

Since the first application of an oil or tar product for holder protection, numerous mixtures of oil, tar and carbon have been compounded in an effort to find the most suitable product that could be developed. It has been definitely proven, through years of experience of the Los Angeles Gas and Electric Corporation, that as far as protection from rusting and pitting is concerned, any neutral oil low in sulphur content renders satisfactory results. However, as far as film texture and appearance is concerned, a great deal of research work can be done to determine what compounded product will render the most satisfactory service for the money invested.

In choosing a non-drying oil for use on the lifts of a water-sealed holder, which will maintain a good black color over a period of one or two years, one must be careful and select an oil that will not be affected by sun rays or that will not easily be washed off by rain water.

IV—Review of Questionnaire on the Use of Non-Drying Oils for Holder Protection

The consensus of opinion of the several gas utilities which responded to the questionnaire sent out is that the use of non-drying oils for holder protection seems to be an improvement over the former painting methods. The holder lifts are better protected against corrosion and likewise present a better appearance. A number of different products seem to have been tried out, with varying degrees of success.

It appears as though protection is obtained with the use of almost any oil product, but that the blackish appearance varies a great deal, depending upon the material used. One company, using a specially prepared mineral oil product, reports a good appearance, with non-drying qualities, after 40 months of service.

The best period of the year to coat the lifts seems to be in the summer time, when the rains are at a minimum. This allows the coating to adhere better to the lifts and when the rainy season approaches, the coating has a much better opportunity of clinging to the holder lifts.

Some of the essential features to consider, in order to obtain satisfactory results in the application of oil coatings are:

1—All lifts should be provided with dam sheets of sufficient height to prevent the holder from overflowing during heavy rains.
2—Install baffles in the cups or pit to prevent excessive loss of oil due to severe winds.
3—Apply original oil coating, either on cleaned metal or painted surface.
4—Apply oil coating during summer season, in order to allow coating to become tacky before rainy season sets in.
5—Use of a non-drying oil that has as many of the following characteristics as possible:
- a—Non-drying
- b—Black in color
- c—Good hiding power
- d—Non-checking
- e—Non-peeling
- f—Smooth in appearance on application
- g—Resistance to rain and wind
- h—Maintain a black color and not turn brown or variegated
- i—Constant specific gravity less than water
- j—Not to emulsify with water
- k—Non-setting in storage
- l—Rust preventative
- m—Constant viscosity
- n—High flash

o—High fire
p—Cost per gallon

V—Oil Coating of Lifts versus Painting

Considerable work has been done by the Los Angeles Gas and Electric Corporation in an attempt to study the relative merits of oil coating of the lifts of water sealed holders in comparison with the older method of painting of the same structures. The following table shows relative comparisons over a five years' period, on a one million, five million and ten million cu. ft. holder. (See page 38 for balance of table.)

Calol Holder Oil was the non-drying oil used in making these comparisons. Red lead primer and green graphite paint were the paints used.

Comparative results between oil coating lifts and painting over a five-year period shows a saving of about half in favor of oil coating. In addition, a better appearing holder is presented and likewise the holder is subject to less corrosion.

Comparative Cost of Oil Coating Lifts versus Painting

1 Million cu. ft. Holder "Oil"

	1st Year	*2nd Year*	*3rd Year*	*4th Year*	*5th Year*
1st Lift	150	100	100	100	100
2nd Lift	150	100	100	100	100
3rd Lift	350	150	100	100	100
Sub-Total	650	350	300	300	300
Grand Total—1,900 gal. oil					$446.50
Labor—1½ Man Days per dip @ $6.00 per Man Day					45.00
Grand Total Cost					$491.50

1 Million cu. ft. Holder "Paint"

(Based on 5-Year Period)

1st Lift	20 gallons primer at	$2.10 per gallon	$42.00
	17 gallons finish coat at	2.00 per gallon	34.00
	23 man days @ $6.00		138.00
2nd Lift	33 gallons primer at	2.10 per gallon	69.30
	28 gallons finish coat at	2.00 per gallon	56.00
	38 man days @ $6.00		228.00
3rd Lift	33 gallons primer at	2.10 per gallon	69.30
	28 gallons finish coat at	2.00 per gallon	56.00
	38 man days @ $6.00		228.00
Grand Total			$920.60

5 Million cu. ft. Holder "Oil"

	1st Year	*2nd Year*	*3rd Year*	*4th Year*	*5th Year*
1st Lift	350	200	200	200	200
2nd Lift	350	200	200	200	200
3rd Lift	350	200	200	200	200
4th Lift	350	200	200	200	200
5th Lift	700	350	200	200	200
	2,100	1,150	1,000	1,000	1,000
Total Oil, 6,250 gallons					$1,468.75
Labor, 3-man days per dip @ $6.00 per man day					90.00
Grand Total					$1,558.75

5 Million cu. ft. Holder "Paint"

(Based on 5-Year Period)

1st Lift	38 gallons primer @	$2.10 per gallon	$79.00
	32 gallons finish coat @	2.00 per gallon	64.00
	45 man days @ $6.00		270.00
2nd Lift	47 gallons primer @	2.10 per gallon	98.70
	40 gallons finish coat @	2.00 per gallon	80.00
	56 man days @ $6.00		336.00
3rd Lift	63 gallons primer @	2.10 per gallon	132.30
	53 gallons finish coat @	2.00 per gallon	106.00
	75 man days @ $6.00		450.00
4th Lift	63 gallons primer @	2.10 per gallon	132.30
	53 gallons finish coat @	2.00 per gallon	106.00
	75 man days @ $6.00		450.00
5th Lift	63 gallons primer @	2.10 per gallon	132.30
	53 gallons finish coat @	2.00 per gallon	106.00
	75 man days @ $6.00		450.00
Grand Total			$2,993.40

VI—Metals in Gas Holder Construction

The proper kind of metal to use for gas holder construction is a problem which should warrant a passing comment, at least.

Quoting Mr. Samuel Cutter from the *Gas Journal*, November 23, 1927; As a matter of historical interest, he thought some reference should be made to the design of the old cast-iron columns and tanks, which were replaced by the use of steel. A holder was built over 49 years ago at the Ipswich Gas Works of wrought iron. He believed this was the first wrought iron tank to be erected in this country and it was still in use and in perfect condition. He mentioned this because it served as an example of the lasting qualities of iron as compared with steel.

Mr. T. R. Baker, under the same reference, made comment of a holder that was built in Bristol in 1866. This was entirely of wrought iron with the exception of the columns, which were of cast iron; and it was only within the last few years that they had been called upon to make certain repairs on the holder, and curiously enough, those repairs were to the externally exposed parts which had corroded.

Major Richard Miles referred to recent researches upon the relative corrosion of the three most popular materials used in the manufacture of gas holders—wrought iron, Armco iron and mild steel. Dr. Newton Friend immersed several samples of each of the materials in sea water for some years, and found that the relative loss in weight was as follows: Wrought iron, 100; mild steel, 126; and Armco iron, 152.

From the above comments, it appears as though good old wrought iron seems to be as satisfactory as any metal on the market for the economical construction of gas holders.

(Continued on page 38)

Colorado Utility Makes Unique Record in Handling Flood Emergency

By LUCIUS S. FLINT

ABOUT 57,000 of Denver's 74,000 users were without gas Sept. 11 for the first time in 64 years, but due to exceptional foresight on the part of officials of the Public Service Co. of Colorado and to the strenuous day and night efforts of hundreds of employees, the supply was restored in only seven hours, and many accidents which might have occurred were prevented. Although all agencies and facilities were held ready for instant call, not a single major accident was reported, and users were spared any serious inconvenience as a result of the temporary cessation of service.

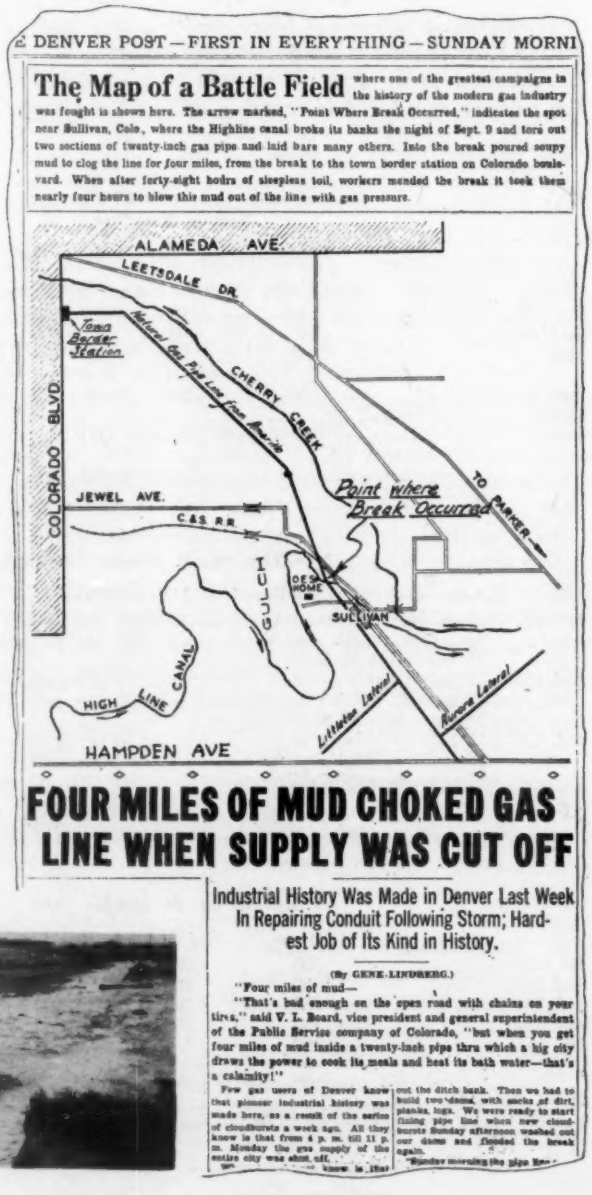
The story of how the western utility handled the emergency when a flood took out two joints in the Amarillo-Denver supply line Sept. 9, cutting off the natural gas flow, is one of unique achievement.

Within a few minutes after the line went out, preparations for making repairs were under way, but unexpected weather handicaps prevented completion of the job until late the night of Sept. 11. Meanwhile, the manufactured gas standby plant in Denver was put into operation. A half hour after the break occurred, the superintendent of the plant had been notified, and within another 40 minutes the work of producing manufactured gas had commenced. The stored supply of natural gas was soon exhausted, and by 5 A.M. Sept. 10, all of North Denver was being supplied with the manufactured product. Two hours later, the whole city was being supplied by the artificial plant.

For 42 hours, the standby plant served the whole city, but at 4 P.M. Sept. 11, consumption had increased, due to cool weather, to such an extent that it was unsafe to continue the city-wide service, and it was then that the real emergency occurred. The sudden use of automatic heaters, gas furnaces and ovens jumped the summer consumption of about 7,000,000 cubic feet to better than 15,000,000 cubic feet, and Monday afternoon with the pressure so low in many mains that a slight breeze would blow out the flame, the demand continued to mount.

Officials realized that thousands of users would be unaware that their burners had gone out and homes and buildings would gradually be filled with gas, with the possibility of explosions wherever matches were lighted and in numbers of cases of partial or complete suffocation. So the drastic step of cutting off the supply to all but about 17,000 North Denver users was decided on. Officials determined to continue service on the north side rather than anywhere else because there are fewer electrical appliances in homes there than anywhere else.

But still further steps were required if the explosion hazard was to be removed. Had the mains been closed without notice, thousands of



DENVER POST—FIRST IN EVERYTHING—SUNDAY MORNI

The Map of a Battle Field where one of the greatest campaigns in the history of the modern gas industry was fought is shown here. The arrow marked, "Point Where Break Occurred," indicates the spot near Sullivan, Colo., where the Highline canal broke its banks the night of Sept. 9 and tore out two sections of twenty-inch gas pipe and laid bare many others. Into the break poured soupy mud to clog the line for four miles, from the break to the town border station on Colorado boulevard. When after forty-eight hours of sleepless toil, workers mended the break it took them nearly four hours to blow this mud out of the line with gas pressure.

FOUR MILES OF MUD CHOKED GAS LINE WHEN SUPPLY WAS CUT OFF

Industrial History Was Made in Denver Last Week In Repairing Conduit Following Storm; Hardest Job of Its Kind in History.

(By GENE LINDBERG.)

"Four miles of mud—

"That's bad enough on the open road with chains on your tires," said V. L. Board, vice president and general superintendent of the Public Service company of Colorado, "but when you get four miles of mud inside a twenty-inch pipe thru which a big city draws the power to cook its meals and heat its bath water—that's a calamity!"

Few gas users of Denver know that pioneer industrial history was made here, as a result of the series of cloudbursts a week ago. All they know is that from 4 p. m. till 11 p. m. Monday the gas supply of the entire city was shut off.

out the ditch bank. Then we had to build two dams, with sacks of dirt, planks, logs. We were ready to start fixing pipe line when new cloudbursts Sunday afternoon washed out our dams and flooded the break again.

"Sunday morning the pipe line—

Right — Newspaper publicity that makes for better customer relations.
Below — Where the rain swollen Highline Canal broke through its banks and sent a destructive torrent into the valley, ripping out two joints of the pipe line and loosening two others.

burners would have been left open. Officials communicated with both daily newspapers, three radio stations and the telephone company, requesting that a warning to this effect be issued immediately:

"Turn off all gas burners immediately and keep them off until further notice. When the gas supply is restored, use caution. In lighting gas stoves and ovens, first be sure that the room is not gas filled. Do not attempt to light automatic appliances such as furnaces. Telephone the gas company and a man will be sent to light these appliances." Follow-up announcements were used later.

Giving rare cooperation, the telephone company put 80 extra operators to work calling homes of subscribers and delivering the message. About 40,000 such calls were made the evening of Sept. 11. The minute the supply was cut off, the six Public Service Co. operators handling 21 trunk lines manned by all available office employees were in readiness for the avalanche of inquiries which was to follow. Within a few minutes, the operators were overwhelmed and calls began backing up on the automatic exchange. As literally tens of thousands of calls continued to come in during the afternoon, telephone company operators cooperated further by taking as many of them as possible and explaining the reason for the gas failure.

A close-up of repair operations on the main break in the Colorado-Interstate line. The joint which took so many hours to weld is seen in the foreground.

Meanwhile, radio announcements were being made at 15 minute intervals. Three stations were used so as to be sure and catch just as many listeners as possible. The announcements were staggered, only one station announcing at one time.

Hurriedly prepared newspaper advertisements told the same story; told it in a graphic, attention-compelling manner!

The minute it was possible to restore service, a force of 175 experienced men was mobilized to handle turning on of automatic appliances. They worked day and night.

In addition to eliminating the explosion hazard, the Colorado company's plan of getting customers to turn off their own valves, saved users the inconvenience of being without service for a number of days. It would probably have taken nearly a week for company employees to turn the gas off in individual homes and another week to restore the connections.

Unprecedented Demand

The standby plant served its purpose admirably until required to supply an unprecedented demand. As far as can be learned, this is one of the few times a manufactured gas plant has ever been called into emergency use when the natural supply failed. The plant in use is one of the few of its kind in the country, having been installed only this July at a cost of about $25,000. The product turned out by the oil process is 1,000 B.T.U. gas, approximately the same as natural gas.

All the trouble started when flood water raised the Highline Canal so that it overflowed in a dozen or so places and finally broke its banks at a point near Sullivan, Colo., sending a torrent of water down the gulley to tear out two joints in the Amarillo-Denver line of the Colorado Interstate Gas Co. and expose some 1,500 feet of the pipe.

(Continued on page 34)

KLZ TAbor 6316 DATE WRITTEN _____ BY Mark on phone order from ROWLEY Speaking for Mr. Jonson

ADVERTISER Public Service Co. ADDRESS

START DATE END DATE DESCRIPTION OF PROGRAM

DAY AND TIME OF BROADCASTS

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		6:45 AM Every 15 Min				

REMARKS:

Give every 15 minutes until notified by pub service co. Log full time .

Important notice to Denver Gas users:

Natural gas has been turned on again and is now available for use. Use the greatest caution in turning on your appliances.

Read this P Slowly & Repeat

If you have a gas range or hot plate , light a match, hold it over a top burner and turn on the valve for that burner. Allow it to burn for about five minutes , watching to see that the flame does not go out. Before lighting an OVEN burner, leave oven door open for a few minutes with the gas off; then hold a lighted match to the burner and turn on.

DO NOT ATTEMPT to light automatic gas equipment such as storage water heaters or thermostat-controlled furnaces . Call the Public Service Co. today- Thursday September 12th— to come and inspect and light these burners. The company will respond as quickly as possible and will appreciate your patience in waiting until they can reach you to take care of this kind of equipment.

IF YOU HAVE ANY KIND OF AUTOMATIC GAS EQUIPMENT ,PLEASE LOOK AGAIN AND MAKE SURE THAT ALL VALVES ARE CLOSED TIGHT AND THAT YOU CAN HEAR NO HISSING OF ESCAPING GAS. DO NOT TRY TO LIGHT THIS EQUIPMENT.

A specimen of the broadcast from KLZ Station

Notes on High Pressure Gas Distribution

In which the Field Survey and the necessary Equipment for carrying on the same are outlined

By DISTRIBUTION ENGINEER

THE reconnaissance survey being completed, there is considerable detailed information to be secured by an intensive field survey of each street it is proposed to serve. The organization of the field survey crew usually develops as the reconnaissance survey progresses, it being advantageous to have a crew in the field to occasionally assist the engineer in obtaining preliminary information. The original crew may be the nucleus of several field survey crews if the project is sufficiently extensive.

Personnel of Field Crew

For each field crew three men are preferable, their duties being indicated by the titles given, which are usually: field survey foreman, draftsman and tapeman. The foreman, who is the extra man of the crew, observes and notes the miscellaneous details which will be of value to the designer, estimator and constructors, supervises the other members and selects the side of the street on which the main will be run, all of which requires keen observation of small details. When considerable taping is required the work is materially hastened by the foreman acting as one of the tapemen. The foreman should not be handicapped by routine which would leave insufficient time for proper observation and study.

The draftsman is usually the member of the crew whose work lags behind the others, as information can be supplied quicker than it can be accurately recorded. For this reason the draftsman should be provided with every possible convenience and notebooks furnished the remaining members for the recording of such information as can be clearly conveyed and correlated by that method. An efficient draftsman will minimize delays; however, he should not

Wheel for Measuring Distances

be rushed, as accurate and clear recording of information is of more importance than speed. The mass of accumulated detail will be unintelligible to designers in an office unless it has been neatly portrayed in the field.

The tapeman, as the name suggests, measures whatever dimensions are required. A familiarity on his part of the reasons for the measurements taken results in securing a better field record. Each section measured with a measuring wheel should be repeated and an additional check made by estimating the distance. Accuracy in estimating is increased by a knowledge of the average distance between poles, water hydrants, concrete slabs on roadways and other uniformly spaced structures.

Counter for Quickly Counting Buildings, Poles, etc., along the Line of Survey.

Progress of Field Survey—The point where the distribution system is to be tied in to the transmission line is fixed, and, therefore, usually selected as the starting point of the field survey. From that point measuring progresses to the meter, storage and control locations, thence along the sub-transmission main to the more concentrated sections. The sparsely settled outskirts of a town are usually the last to be surveyed, since the serving of a considerable part of such sections depends on the streets selected for sub-transmission mains and the routing of other distribution lines.

The amount of measuring which can be expected from a single crew in a day varies considerably, being about one mile per day in sections of concentrated buildings and as much as five miles per day on long continuous rural lines.

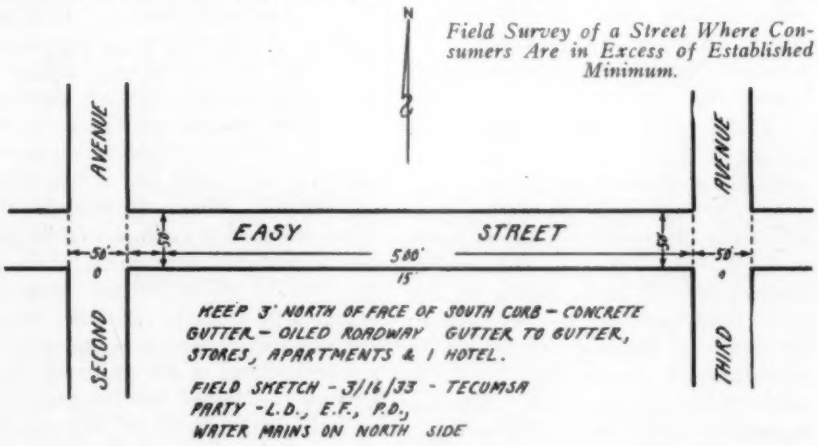
Permanency of Data

Field data should be permanently recorded as soon as possible after being obtained, and not allowed to accumulate. When the field crew is also selected for drafting and design work the interpretation of field notes is naturally easier, and lack of information may often be supplied from memory, thereby materially speeding up the finished plans.

Maps for Field Crews—The time spent in securing the best existing

maps is an economy, since it lessens the work of the field crew. The source of such a map may be insurance companies, real estate boards, political bodies, commercial atlases, aerial surveys and other utilities.

Field Survey of a Street Where Consumers Are in Excess of Established Minimum.



Within political bodies there are various departments, such as the divisions within the federal government, tax assessors, highway offices, sanitary divisions and the control board, to be investigated as map sources, since each has its own particular reasons for their use. When securing maps, inquiries should be made regarding the availability of a list or map showing specifically the highways which have been legally deeded to the political unit and other highways which the unit considers part of the road system by right of usage and maintenance. Although uneconomical to search records for the purpose of determining the deeded highways, a list, if available, will assist the engineer in cautioning construction crews as to undeeded roads on which property owners have a legal right to demand cessation of construction work.

Maps secured from such sources as insurance companies, real estate operators, tax assessors, etc., emphasize buildings and lot divisions rather than accurate street layouts. Often such maps do not properly portray street intersections and may indicate a street as continuous, whereas, at some intersections, it may be considerably offset on opposite sides of the intersecting street. When the designer checks field information against maps used, such a condition would result in confusion. In other instances, two long parallel streets may be indicated with frequent connecting streets, whereas some condition may exist making the use of connecting links impractical or impossible and, therefore, tie-ins planned from map conditions are not feasible.

The most effective map is an aerial photograph on which the scale may be altered by enlargement to suit requirements. If enlarged to scales of two hundred to five hundred feet per inch, aerial maps should be carefully checked to determine the resulting accuracy before scaling dimensions from the map. Usually such photographs are made at eight to ten thousand feet elevation and accuracy depends on the pilot maintaining a constant elevation and level. Oblique photography must be more carefully checked before scaling than vertical. The decided advantage of an aerial map is that it shows all streets as they actually exist and not as desired by some real estate operator or others having personal factors at stake.

Equipment—An automobile is essential for a survey crew, and its type has an effect on the speed with which work progresses. A commercial suburban type of car with open sides and back, equipped with curtains for inclement weather, provides a convenient space for the draftsman when supplied with a desk or drawing table. A desk has the advantage that the drawer space may be used for storing supplies and protecting completed sketches from the wind which otherwise may blow away unnoticed by any of the crew. The desk used is ordinarily provided with a drawing table top for the convenience of the draftsman. For both bad weather conditions and when it is necessary to work in the dark, a light should be provided on the desk; such a light costs but little and when connected to the car battery is more satisfactory than oil or portable gas lights.

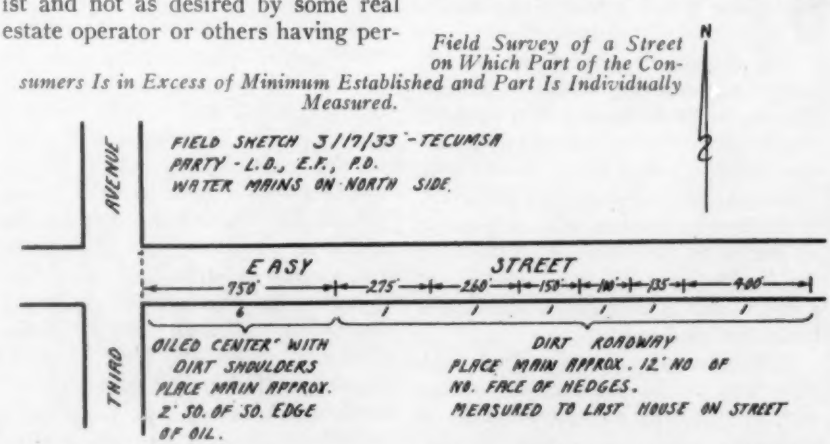
Some use a closed car with a portable drawing board, but the cramped quarters in which the draftsman must work and the poor visibility are handicaps. Visibility for the draftsman is desirable so that he may plot up details as they appear without frequently leaving the drafting board.

The speed of the draftsman's work is increased by the use of standard cross section paper for field sketches, as much of the sketching can be done free hand eliminating the use of tee square and triangles.

The cross section paper also provides a simple means of drawing to approximate scale without loss of time.

A counter provided to both foreman and tapeman helps in eliminating the common error of dropping measuring units and miscounting buildings. The counting of buildings is generally done while a car is in motion and other details are being observed, which results in inaccuracy when attempting to count buildings on both sides of a street.

Field Survey of a Street on Which Part of the Consumers Is in Excess of Minimum Established and Part Is Individually Measured.



The use of a counter by the tapeman consists of totalling the poles or other known units of space passed while pushing the measuring wheel and also observing that it records properly. In the use of a counter every man should be cautioned to form the habit of pressing the counter at some particular point such as directly on passing the object rather than looking ahead and totalling several objects and attempting to remember the last one selected.

Photographic Records

The value of photographic equipment in reconnaissance work has already been mentioned, but its scope is broader in the field survey. Some companies follow the practice of photographically recording every section where the main is to be laid, not only for the advantages resulting to designer, estimator and construction gangs but also to show the condition of streets previous to construction work, for the purpose of defending any alleged damage suits the causes of which can then be charged against the general condition of streets rather than construction work. A photographic record should be made of all trees affected or dead along highways on which mains are to be laid, in preference to notes or drawings. With photographs in the hands of the engineer, constructing foreman and in the central office, changes at any period of construction are more quickly approved, as conversation regarding a particular detail is materially assisted by pictorial representation.

For distances greater than a tape length a measuring wheel eliminates the necessity of having two men on a tape or the inconvenience of a single tapeman using a pin at one end. The measuring wheel is an accurately made metal wheel with a counter so geared as to record in actual feet; the component parts are mounted on a rod which is held in the operator's hand for pushing.

A hundred or two hundred foot tape with a pin attachment on one end, so that only a single tapeman is necessary when measuring details, should be part of the equipment. With the proper type of short pin it is frequently possible for the tapeman to insert the pin in seams between concrete slabs. The desired accuracy of a field survey for gas distribution is not sufficiently high to require the use of steel tapes, and a wired cloth tape is preferable, as it requires less cleaning, care and withstands more severe usage for a short period without breaking. The cloth tapes will wear out quicker than metallic tapes but their cost is not a factor in a survey when the greater convenience of their use is considered.

A level or transit is seldom used on a field survey providing information for a distribution design. Unless extreme conditions of topography exist, the cost of a set of levels is beyond the value of the results. Such a set of levels taken on the ground surface can not be used to predict the location of all drips necessary on the finished main, as sub-surface structures and conditions materially affect the number of drips required. The use of a transit for securing exact alignments is also unwarranted, as sub-surface conditions have but few indications on the surface. The only use of a transit would be in the establishing of property lines, which is costly work in most suburban and rural conditions and has but little practical value.

Meter and Control Locations—It is important to secure explicit surface and sub-surface details at the transmission tie-in to avoid prolonged shut-downs of the transmission line when making the connection. If transmission records are not available, the main should be exposed for the purpose of indicating the location of joints and their type. The condition of the transmission main as to pipe coating and corrosion is important in selecting the tie-in method and should be carefully noted. The external diameter of the transmission main is important if a saddle is to be used for the connection. When the transmission main is owned by the distributing company it is advisable to locate and operate the transmission valves to determine whether they function properly. Such checking is within the scope of the field survey crew's work which is not only to secure a set of dimensions but to facilitate construction work in every way possible.

The district meter, storage and regulators for pressure are usually placed as near the transmission main as property can be conveniently secured. While none of these items may be installed at the time of the original construction, they should be thoroughly planned, which will be the assumption in this discussion. The meter ordinarily would be installed on the transmission side of the control equipment to take advantage of the higher pressures existing on the transmission mains to minimize the size of meter, although the more uniform pressure on the regulator outlet would increase the accuracy of results on certain types of meters. Measurements on the sub-transmission main should be given from the transmission main to the nearest point on the property which will be used for the meter, storage and regulator equipment. A complete detail of the property lines, existing buildings on the property, and all structures in the highway in front of the property should be secured and notes made of any advantageous equipment locations. If there are existing buildings on the premises the engineer should select suitable parts of these structures for housing the governor and meter, arrange for securing details of the interior and select the points where the mains will pierce the foundation.

If it is necessary to have the meter located at any distance from the transmission main tie-in, the possibility of services being run between the transmission main and meter should be noted for the benefit of the operating and new business departments, as it would be necessary to make special arrangements for billing and unaccounted-for gas reports.

Need for Stubs and Valves

Often property is secured, but regulating, storage and measuring equipment is not installed initially. Under such circumstances it is advisable to provide stubs and valves to eliminate shutting down the sub-transmission main at a later date.

Especially in manufactured gas territories, take-offs from the transmission main for the serving of from a few consumers to small villages are numerous on which no meter, regulator or storage is or will be required for a long period, but a suitable location along the highway for the installation of a regulator in a pit should be selected and the main planned to facilitate such construction.

(Continued on page 36)

ELEMENTS OF GAS TECHNOLOGY

Producers and Their Classification

WHILE it is impossible to outline a classification, which will suit all designs and constructions of producers, the following includes all the important types.

A. Producers operated mainly with natural draft, that is with open hearths.
   1. With fire bars
   2. With solid bottoms

B. Producers operated by blast, usually produced by means of a steam jet.
   1. With fire bars
   2. With solid bottoms
      a. Bottom worked dry
      b. With water bottom

Producers may also be classed by direction of draft, pressure, method of feeding and poking, method of ash removal and cleanliness of gas.

There are two types of producers according to the direction of the draft, namely the up-draft producers and the down-draft producers. In the latter type the green coal and the mixture of air and steam are admitted at the top. The gases pass down the producer and are finally removed through an outlet at the bottom. One advantage of this type of producer is that it manufactures the purest gas, for the reason that the tar and volatile matter, that are distilled out of the green coal, are cracked or decomposed as they pass down through the bed of incandescent coal. Such producer gas does not contain any coal gas. The moisture in the fuel is also given an opportunity to react in the fuel bed. Nevertheless, this type of producer has not enjoyed much popularity for several reasons. In the first place the fuel is ignited only with difficulty and the location of the oxidation and reduction zones varies considerably. Furthermore, the grates burn out frequently and considerable difficulty is incurred in maintaining uniform operation and quality of gas.

The up-draft producer is the type in most common use, the mixture of air and steam passing up through the fuel bed as it descends and the gas being taken off at the top. Its main disadvantage is that the gas contains soot and tar derived from the bituminous coal used. Furthermore, the moisture in the fuel does not have a chance to react in the fuel bed, and hence is contained in the gas and reduces its thermal power.

Producers may be operated under suction or under pressure. The suction gas producers are usually provided with a grate and the mixture of air and steam is generally drawn through the fuel bed by means of an exhauster or a stack. In such producers the rate of gas production is proportional to the consumption and hence they are commonly used for heating gas retorts and in power work. Various arrangements are used for producing steam to be mixed with the air. The moisture content of the air may be controlled by passing it through a humidifying tower before it enters the producer.

Steam injectors or a steam-driven turbo-blower is used to supply the pressure in the pressure type of producer. The steam injector is the cheapest device and its operation is also least expensive, but it is not a flexible apparatus. Thus it does not allow the production of the producer to be stepped up. It cannot increase the delivery of air to the producer without at the same time changing the ratio of air to steam entering the producer. This ratio must be kept constant for any given fuel. Hence the only way in which the steam-coal ratio may be maintained constant is to change the size of the nozzle of the injector.

The fan or turbo-blower does not have this disadvantage. A single-stage or multi-stage fan may be employed for delivering air under two to three pounds per square inch pressure and a turbo-blower is used for higher pressures. As the load on the producer increases, the speed of the blower can be likewise increased. The proper quantity of steam is admitted by the humidification of the air at the proper temperature, or by bleeding in a thermostatically controlled quantity of exhaust steam from the blower itself. The air-steam ratio is thus kept constant. In spite of the greater first cost it is found that the steam-driven blower will be found to be more economical in the long run, especially where the load on the producer varies considerably.

Producers may be hand-poked and hand-fired, or mechanically-fired and mechanically-poked. The hand-operated producer naturally has the lower first cost but there is no great surety of uniformity of the quality of gas produced. The labor must be skilled and experienced. Only small plants are commonly of the hand-operated type.

Mechanically operated producers are very much higher in cost, but they produce a much more uniform gas and allow certain savings in labor of operation. When a poor grade coal is used, they are claimed to afford as high as 25 per cent saving in fuel. Mechanical poking is of course advantageous in removing the necessity of the hard work of hand poking and furthermore aids in the elimination of clinker and blowholes in the fuel bed.

The ash may be removed by hand or by mechanical means. Here again the removal of ash by hand is cheap. but frequently unreliable. The reason for this is that it is very difficult to maintain the fuel bed in constant depth and position since the ash has to be removed uniformly at all points. More ash must not be removed from the edges of the producer than from the center. The uniformity of the quality of the producer gas is disturbed when this is done, as the resistance to the flow of the gas through the beds in the producer is varied.

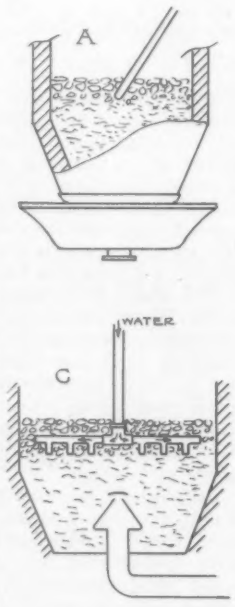
Automatic removal of the ash may be intermittent or continuous. Intermittent ash removal requires a large storage space for the ash in the bottom of the producer. Continuous ash removal is preferred to the intermittent method, since it makes for a more uniform producer gas. The fire zone remains in the same position and there is no interruption of the operation of the producer during the ash removal period. Blowholes and clinker in the fuel bed are less likely to form and the operation is improved all around.

As far as the cleanliness of the gas produced is concerned, as has been stated, the gas from the up-draft producer is hot (approximately 1300 degrees F. in temperature) and is likely to contain considerable quantities of soot and tar when soft coal is used as the producer fuel. When the gas is to be used immediately, the presence of soot and tar is not disadvantageous (except for power purposes) as it affords thermal value, but where the gas is transported over a long distance trouble is encountered with clogging of valves, obstruction of piping, etc. Gas, that is to be used for power purpose, must be scrubbed and cleaned, this usually being done with the aid of towers filled with coke, glass wool and the like.

Amongst the most commonly used producers in this country is the Wellman producer, which is featured by a vertical, water-cooled finger, attached to the stationary top of the producer and oscillated from center to side of the fuel bed as the producer body and its contents revolve. This finger pokes the fuel bed. Automatic ash removal is effected from a revolving grate. The Wood gas producer is poked by two water-cooled, J-shaped vertical stirring arms which

revolve about their vertical axes and stir the fuel bed as the producer revolves. Fuel feed and ash removal are automatic. Figure 5 shows various types of fuel bed agitators in diagrammatic form.

In the Morgan gas producer the fuel bed is not poked but is levelled off by means of a horizontal U-shaped arm which rides on top of the fuel bed. As the arm is stationary, the levelling operation is brought about by the rotation of the producer body itself. When caking coals are used, it is found that this method of poking does not give as good results as actual poking, ash removal is automatic. In the Chapman gas producer the body is stationary while the fuel bed is poked by means of a revolving floating agitator. This is made in the form of a rake with water-cooled teeth. The latter extend 8 to 11 inches into the fuel bed itself. Automatic coal feed is provided and ash removal is continuous.



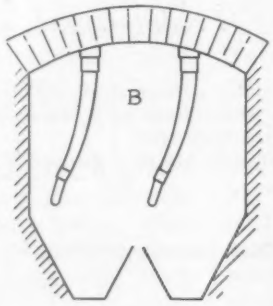


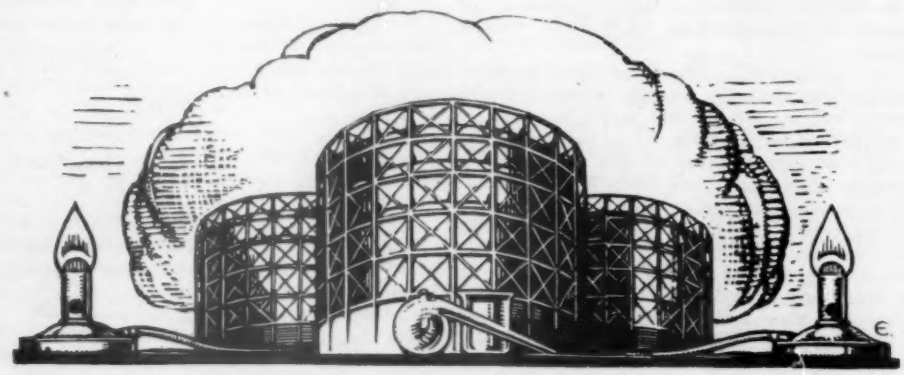
Fig. 5- Mechanical Pokers
A - Wellman
B - Wood
C - Chapman

The Smith gas producer is of the suction type and is poked by hand or mechanically. Steam is supplied by saturating the entering air with water at a controlled temperature. Clean gas is made, purification being accomplished by means of glass-wool extractors. The producer gas also passes through a secondary scrubber.

The U. G. I. gas producer is characterized by its rotary grate and is designed to operate with fuel containing a large proportion of fines. Fuel enters at the top and the space around the upper gas outlet is always kept full of fuel. This method of feeding the fuel allows the larger pieces of coal to collect in the center of the producer and the fines fall down along the sides. Good operating conditions are thereby produced. The producer is water-jacketed at the lower part so that steam is produced in sufficient quantity for admixture with the air blast. No fire-brick lines this part of the producer and it is claimed that there is less tendency for clinker to collect and cling to the walls. This type of producer can be operated with coke containing 50 per cent breeze.

In Europe by-product recovery producers, slagging ash producers and the Wollaston producer represent types which are not common in America. The by-product producers allow the recovery of nearly two-thirds of the original nitrogen content of the coal in the form of ammonium sulfate. Tar and tar products are also recovered. In the slagging-ash producers the ash is caused to fuse and the melted product is then removed. No steam is used in these producers and an air-blown producer gas is produced. The fusion of the ash avoids all difficulties of removal.

The Wollaston gas producer is of very novel design. A special feeding device is used. The coal first passes through a cylindrical upper section in which it is coked at low temperature by the hot gas rising from the producer proper. The producer proper is made in the form of an annular steam boiler, providing sufficient steam for mixing with the air. The ash is automatically removed. There are no clinker troubles due to the cooling of the producer bed and the apparatus is especially adapted for the recovery of by-products without giving a high carbon dioxide gas. The gases leave the producer at a temperature of 500 degrees F. and the cold efficiency of its producer is said to be about 80 per cent.



A Co-operative Plan That Bids Fair To Produce *Results*

By

WILLIAM J. CASHMAN

Trade Relations Director, Empire-New York Group, Associated Gas & Electric System

and

FRED S. HOEFER

Assistant New Business Manager, Empire-New York Group, Associated Gas & Electric System

SINCE June 1, 1932, the Empire Gas & Electric Company, the New York State Electric & Gas Corporation, and the New York Central Electric Corporation—all in Central New York—have been promoting among all gas and electrical appliance dealer outlets in their territory a new plan of co-operative merchandising.

The idea was originally inaugurated in the Ithaca district of the New York State Electric & Gas Corporation on Jan. 1, 1932, where it was found so practical and to meet with such favor among local appliance merchandisers that it was decided a few months later to adopt the program in all the communities served by the Empire-New York Group.

Essence of the Plan

In a nutshell, our plan aims to instill mutual understanding between the utility and the dealer, and to bring added revenue to both—to the former through additional load to its gas and electric lines, and to the dealer through profits on the increased volume of load building merchandise sold.

One of the reasons for our decision to work out a cooperative merchandising plan of mutual benefit to the dealer and the utility, as well as to the manufacturer, the jobber, and the consumer, was the fact that the present economic crisis with its temporary breakdown of the distribution system has resulted in agitation affecting the larger corporations, including utilities, throughout the country.

In the field of retail merchandising the agitation has been, for the most part, against corporate structures which have capital to employ executives who know how to devise efficient methods to improve distribution. Through more scientific distribution these corporations are securing a greater portion of the consumer dollar than others and, thus, are supposedly impinging upon the alleged rights of local entrepreneurs who desire the field for themselves alone.

This agitation, in some cases, has reached a point where it has forced large corporations to discontinue merchandising, although the validity of such action is still in doubt. Since much of this agitation is directed toward the public utility companies, these organizations should not only take steps to meet the immediate issue of maintaining legal rights to continue their merchandising existence, but to study the situation to see if it does not reveal some fundamental weakness in their method of merchandising appliances to the public.

A Marketing Era

The present is the marketing era for public utilities according to many executives and leaders in the utility field. This youthful but prodigious activity is experiencing a notable period of research which was preceded by two other stages of development, namely, pioneering and intensive merchandising. Constant appliance merchandising for load by gas companies is necessary since the welfare of such service corporations depends upon the thousand cubic feet of gas consumed by the public. This interdependence is unquestionable. Since this relation exists and will exist as long as either of the component parts, the logical way to build load with the greatest rapidity would seem to be through some plan which has two natural expressions in merchandising, harmony and intensity.

Cooperation—The Basis

Profitable merchandising in the complex economic structure of this era is built upon the bed-rock of cooperation between the manufacturer and the jobber or retailer. Neither one, unaided, can successfully beat a path to the door of the consumer. Whatever results might have been accomplished in former days by this policy of playing the lone hand, the tempo of present day business, accelerated by continuous and intense competition, demands that the producer and the middlemen marshall all their available forces to keep step with this competition and battle down the wall of sales resistance erected by the ultimate consumer.

Gas companies throughout the country are seeking to justify their continuance in the merchandising business on the following basis:

First—That the public utility company has a definite responsibility to the consumer in rendering service that will be put to use to the greatest advantage of the consumer.

Second—That this responsibility includes the development of new applications for the use of the service rendered, and such other activities as are necessary to the creation of public acceptance for these appliances.

Three—That the promotional sale of appliances is interwoven with the cost of service to the ultimate con-

sumer, resulting in rate reductions which widen the market for similar applications, and promote the use of new applications which previously were prohibitive because of rates.

How a Plumbing Contractor Trimmed His Window in Ithaca.

Fourth — That this activity increases potential market reacting favorably to other merchandising organizations.

If our justification for merchandising is load increase, based upon the foregoing implied responsibility to the consumer in rendering service, then we must admit that all outlets which tend to promote our objectives are vital factors in furthering the success of our activities.

Gas appliance dealers have a definite function which, if properly performed, can do much to accelerate our merchandising efforts. A strong, militant, loyal dealer organization, imbued with enthusiasm for the products it handles as well as the utility company which renders the service in the community, is not only invaluable, but it is indispensable to the prosecution of a successful marketing campaign. To develop these factors is one of the most important objectives the utility company should set for itself.

A Strategic Position

With a vast reservoir of experience at its command, with a staff of specialists versed in the merchandising problems which the retailer must encounter, and with the financial structure which enables it to undertake comprehensive research activities, the utility company is in a strategic position to promote the sale of load-building products through dealer cooperation and dealer education. The utility company which, through ignorance or stubbornness, neglects to extend this cooperation, will fall far short of realizing the fullest potentialities of its market and must expect to suffer severely from more wide-awake competition offered by other competing industries.

This presentation of a merchandising plan in cooperation with dealers is not only the result of a desire on our part to eliminate any unfavorable opinions that they may have had, either just or unjust, against the utility, but also the result of a market analysis which we conducted in the Ithaca district which revealed some enlightening facts.

In conducting this survey the following facts were emphasized:

1. Number, type, and quality of load building appliances in the home.
2. Percentage of these load-building appliances sold by dealers.
3. Purchasing power of the market.
4. Types and classifications of dealers, such as aggressive, backward, friendly, etc.

Our analysis brought to light the following vital facts:

First—That the saturation of load building items was about equal to the national average.

Second—That dealers sold only a small percentage of load building items, but by far the greater percentage of the small load building appliances.

Third—That aggressive dealers were not as bitter in their criticism as the backward type of dealers were inclined to be.

Fourth—That the gas industry was securing a small proportion of consumer's dollar spent in retail stores in comparison with the sales of other industrial groups.

Fifth—That there was a lack of coordination of effort between jobbers, manufacturers, and retailers.

Sixth—That the utility company's past merchandising policies have encouraged practices which were driving legitimate dealers from the field.

Seventh—That the utility company was the logical sponsor of cooperative effort among gas appliance outlets in the territory it served.

The dealers in gas appliances, we found, were not aggressive, coverage was inadequate, display facilities were not effectively used, and concentration was not upon load-building products. Advertising was spasmodic and not coordinated for the development of the market as a whole. There was constant bickering, price cutting, etc., for the smallest portion of the consumer dollar secured by any of the industry groups.

Predication of the Plan

Therefore we set about formulating a dealer cooperative plan which would be predicated upon the idea of eliminating competition between dealer organizations and the gas company in the sale of appliances. The backbone of this plan is intensive advertising, promotion, and merchandising of major load building appliances by all outlets. We believed that if the utility company and the dealers cooperatively concentrated their attention upon load-building items, we would stimulate a great amount of customer acceptance for those appliances. In this manner we would break down selling resistance, direct the consumer's desire toward products which we had to sell, and increase publicity which would make the market gas and electricity conscious, and thus increase sales of appliances to our mutual advantage.

The plan provides that the utility's merchandise sales organization continues to function as formerly, but, in addition, it now acts as a promoter of sales for all outlets in the ter-

Prominent Hardware Store in Ithaca Features Gas Appliances in Its Window Display.

ritory. The utility's sales manager finds himself responsible for the progress of all retailers of gas appliances in the district. In the execution of his duties, he strives to obtain the maximum potential business which the territory will produce for all the merchandisers. He stresses the promotion of major load building appliances by these outlets.

Assistance—Not Competition

Although the utility company's salesmen continue to aggressively canvass the territory, their efforts to obtain prospects is not to increase competition with dealer organizations, but to assist them in making sales whenever it is found that the prospect has been contacted by a local retailer.

Since the salesmen's compensation is based upon the load-building status of the appliances sold, this eliminates the incentive to compete with dealers, and actually presents the desire to assist the retailer to close the deal.

When –
Festive
Meals are
in Order
•
thats the
Convenience of an
AUTOMATIC
Gas
REFRIGERATOR
•
AUTOMATIC Gas Refrigeration is a convenience at any time. But, during the Christmas season you need and appreciate this modern convenience all the more. Think of being able to have ample storage space to keep the extra food necessary to meet holiday demands. Think of how handy it is to have it right in the kitchen at your finger tips. Think of the freedom from worry about food spoilage. Think, too, of the many delicious and different dainties you can serve the family.
Considering all of these advantages, you will be surprised at the small cost of GAS refrigeration. Only a few cents a day on the average...far less than any other kind of refrigeration. May we suggest that you investigate today.
Ask us or see ANY DEALER.
Associated Gas and Electric System
LOCAL COMPANY NAME

A Campaign Ad That Helped Considerably

Coordinated advertising, coordinated displays, unceasing education, cooperative campaigns, market development, and cooperative promotion are the underlying basis of our dealer cooperative plan in promulgating successful results.

Load increase is the basis of all quotas set up for any community. These quotas are predicated on the total amount of potential volume of business that it is possible to do in the district, including dealer sales and utility sales as one unit.

Each community is supervised by the district manager and the local new business manager. The community itself is divided into territories, each supervised by a sales representative of the utility. Each territory is allotted a percentage of the district quota. The quota assigned to a sales representative's territory is also based on the total load which is expected to be added through both dealer and utility sales there.

This sales representative or supervisor canvasses and solicits business for the company, keeping up an unceasing survey of appliances in the homes. If, during his canvass, he finds that none of the dealers have contacted the prospect, reported her as a prospect to the utility, or she has no preference from whom she shall buy, he sells the appliance for the utility.

But, if the sales supervisor is led to believe through his conversation with the prospective customer that he is competing with the plumber or the hardware merchant or a local department store in a sale, the salesman reports the prospect to the merchant, and turns his effort to assist him in closing the sale.

The sales supervisor reports to the new business manager as to the progress he is making. He assists his dealers to display appliances, coordinate advertising, educate dealer salesmen, and supervise their effort. He realizes that the higher degree of efficiency he can obtain among his dealers, the greater the sales results in his territory, and the higher his remuneration.

The sales supervisor is paid a straight salary of $67.50 per month, plus a load building bonus calculated upon the annual rating of consumption of gas of major appliances installed in the supervisor's territory regardless of whether his own sales or dealers' sales.

Since his compensation is no greater whether the dealer sells the appliance or he himself, he naturally acquires a tendency to give the dealer the benefit.

Bonuses Paid

Bonuses are paid as follows: automatic water heater, $7.50; refrigerator, $3.50; range, $3.00; incinerator, $3.00; space heater, $1.00; laundry dryer, $3.00; house heating, $15.00.

The foregoing ratings are all applicable to gas appliances. The supervisor is requested to sell gas water heaters and ranges in preference to electrical water heaters or ranges whenever it is possible. In order that he may have an incentive for carrying out the company's desire to build a greater gas load in preference to a greater electric load, the sales representative is given a $15 bonus if he sells an electric automatic water heater where gas is not available. However, if he disposes of an electric automatic water heater to a person served by gas, he rates only a $1.00 bonus.

Similarly, if the salesman disposes of a dairy water heater of the electric type where gas is not available, he receives a bonus of $6.00. If sold on an existing gas line, however, he obtains only a $1.00 bonus. An electric range, if sold where gas is not available, merits the salesman $8.00. If the purchaser lives on an existing gas line, the bonus is again $1.00.

The bonus is determined during the month in which the appliances are delivered and installed, and is due and payable at the end of the current month, by the utility company. If a bonus has been paid, and later the order is cancelled, and the

(Continued on page 27)

Stress *CHILD HEALTH* In Your Window Displays

By
STUART BRATESMA
Manager, Display Department, Boston Consolidated Gas Company

BRINGING up children is one duty in life that should be taken seriously, and any way that parents can be assisted in this job is usually very welcome. By far the most essential factor in child happiness is health. The opportunities for advertising the benefits of constant hot water, at all hours, are many and should be adapted as basic thoughts for modern window displays.

Paramount in the sales argument for child health and gas-heated water is the appeal of children in illustrations. Take a look at the two water heating advertisements shown on this page. Are not the little girls' figures and the boy's head the first things that meet the eye?

Any mother or father passing these window displays would be arrested by these illustrations. There is a universal appeal in children and their actions. It is a simple matter to capitalize this appeal as effective display material. In building our water heating load, which is one of the largest on our lines, we must try every last appeal and idea in presenting advertising to the public that will be accepted as logic; not absurd misstatements and promises. Surely child health is a vital question to most parents and any steps by which they can lessen the dangers of ill health are of particular interest to them.

It is stupid, of course, to state that by merely buying an automatic gas water heater all ills vanish from the home. The logical way to "get over" child health sales messages is to write copy in the form of teaching the youngsters to use lots of hot water daily. Make the reader conscious of the telling effects of regular usage by children and your job is half done.

The gas industry is finally awakening to the fact that it must adopt an aggressive program of advertising to compete with the organized medias of electrical company and manufacturer publicity. We have

nothing to hide from the public in our industry, nothing old-fashioned or worn out. New, improved appliances are constantly making their appearance and we have the tried and dependable service of solid gas companies to back things up. And remember, gas costs less. But, does the public know this? It is up to us to tell each reader of our advertising the modern story of gas in strong, logical terms. Gas is not the fuel of yesterday, as our competitors would have the public believe, and it behooves us in our advertising to counteract this thought. Educate the passerby with window displays. Tell him the story of gas in bold, colorful strokes. Window advertising can do this, if you give it a chance.

Child health is only one thought in using accepted appeals in window displays. There are many more equally as effective. Give a serious thought to this far-reaching medium right in your own building. It pays great dividends!

Cooperative Plan Bids Fair to Produce Results

(Continued from page 25)

merchandise returned, or has been repossessed by the company or dealer within three months of the date of installation, then the bonus is charged back against current earnings of the supervisor.

No car allowance is made except when the supervisor's territory is outside the city limits, and when he uses his own machine in the performance of his duties. Then his allowance is $20.00 per month.

The new business manager, who is in charge of the sales representatives, has instructions to merchandise intensively in the district, through sales campaigns, cooking schools, and other cooperative methods. He coordinates his activities with cooperative window displays, cooperative advertising, and general promotional effort. He contacts the dealers as well as the salesmen, and seeks to rectify or smooth over any misunderstandings that may inadvertantly crop out. The new business manager supervises all activities pertinent to the routine of plan operation. He maps out the sales drives that are promoted at various times of the year. There will doubtless be two campaigns for the sale of gas ranges and automatic water heaters, and at least one on gas refrigeration.

A monthly news bulletin is issued which summarizes the utility's merchandising plans, together with proofs of advertising. This bulletin is sent to all dealers, as well as to the jobbers and manufacturers involved. Through this medium, all outlets are informed in advance of the company's plans for the month to follow, and they are encouraged to plan their merchandising activities and advertising to tie in with that of the utility. To secure the cooperation of all outlets, the words, "Ask us, or SEE YOUR DEALER," is featured in all appliance advertising copy.

These advertisements do not call attention to specific types, trade names, or prices, but promote the dealer market. They stress low cost of operation, convenience, utility, etc., and thereby create customer acceptance for all dealers.

Inasmuch as gas consumers are continually coming into the utility's office to pay bills, the office floor is considered an ideal place to call the people's attention to the latest styles and types of gas appliances. The dealer is afforded the opportunity to display his merchandise on the utility's sales floor, and this is widely taken advantage of. The dealer does his own carting of the appliance, and a card is placed on it stating his name. The floor-salesman hands over the names of prospects to the dealer, and the utility is glad to assist in closing the sale.

Assignment of Installation

The installation of appliances is assigned to plumbing contractors and dealers who have facilities for rendering prompt and efficient work at reasonable prices. The allocation of installations to such dealers is done without discrimination. The utility, however, insists upon quality work and satisfactory operation of the appliances installed, as a part of its responsibilities to its customers.

Since paternal cooperation is not deemed sound and as dealers as a whole insist upon maintaining their independence, we do not feel that the utility should assist dealers in financing their sales, but, on the other hand, should adopt a plan comparable with that of any group of reputable finance corporations, and make the services of such corporations available to all dealers involved.

Whereas the utility formerly charged 6 per cent per annum on the unpaid balance, the following are the revised finance terms, charges, etc., that apply on all deferred sales made by it: three months, 5 per cent; four months, 5½ per cent; five months, 5¾ per cent; six months, 6 per cent; seven months, 7 per cent; eight months, 7½ per cent; nine months, 7¾ per cent; 10 months, 8 per cent; 11 months, 8½ per cent; 12 months, 9 per cent; 13 months, 9½ per cent; 14 months, 10 per cent; 15 months, 10½ per cent; 16 months, 11 per cent; 17 months, 11½ per cent; 18 months, 12 per cent; 19 months, 12½ per cent; 20 months, 13 per cent; 24 months, 15 per cent.

Believing that a trade-in policy was "unsound business," and that there would be more profit for all if everyone discontinued the practice, the company abandoned trade-in allowances on all appliances.

The utility maintains an appliance testing laboratory, and only such merchandise as passes a rigid test is carried in stock. Price-cutting is taboo. The manufacturer's recommended sales price is used in all cases.

Dealers are requested to sell load-building appliances on an installed basis, as this method of selling, the utility found, seemed to produce more sales. Inasmuch as the company does not compete with the dealers, our respective selling prices must be as nearly comparable as possible.

Since the success of the cooperative merchandising idea depends, to a large extent, upon closer contacts between the utility company, the dealer, the jobber, and the manufacturer, our monthly contact letter to the dealer conveys information about appliances, new selling ideas, better installation methods and subjects pertinent to the successful conduct of this cooperative program.

(Continued in December Issue)

Technical Digest

Testing Pipe Coverings

A large number of newly proposed pipe covering materials were tested under electrical, thermal and mechanical stress. Observations were also made on the behavior of these materials at low temperatures. The

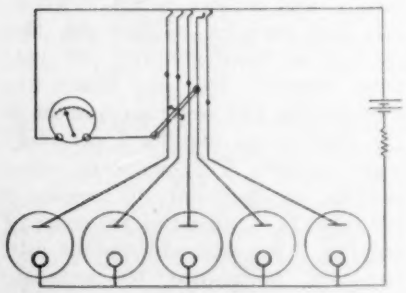


Figure 1.

first experiments were made on sections of pipe, imbedded in sand of constant moisture content in suitable cylindrical vessels, an electric current being passed through the apparatus, the electrical connections being made as shown in figure 1. The experiments lasted about 240 days. Results obtained with a chlorinated rubber coating are shown in figure 2. The curves (28) and (29) refer to a well dried covering obtained by smearing on a solution of the chlorinated rubber in a suitable volatile

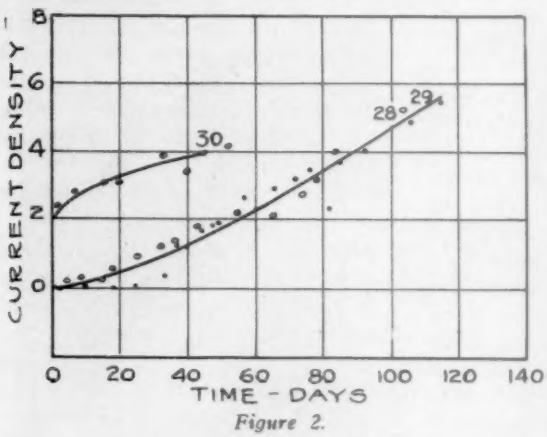


Figure 2.

solvent and allowing the solvent to evaporate, while curve (30) represents a covering burnt into the pipe at low temperature. The ordinates show the measurements of current densities in milliamperes. Other experiments were made with pipes covered with cotton strips impregnated

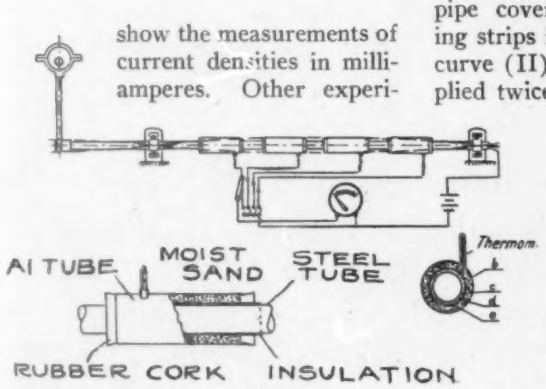


Figure 3.

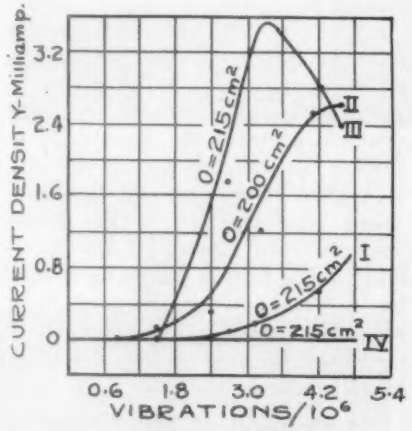
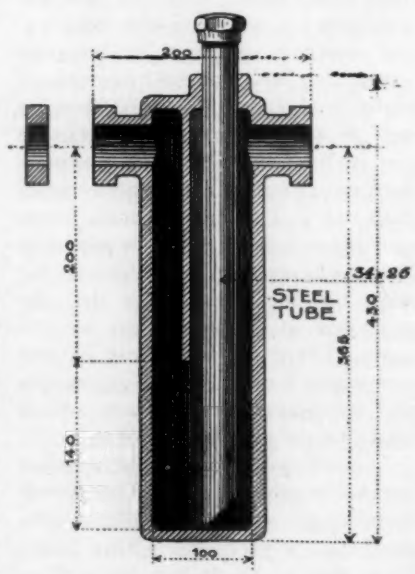


Figure 4.

with plasticized bitumen, also pipe covered with rubber-paraffin mixtures. An apparatus was devised for determining the action of cold and vibration simultaneously on the pipe covering. This apparatus is shown in figure 3. The pipe is fastened to a device which produces vertical vibrations with the aid of a cam. Cooling is effected with carbon dioxide snow. Various coating compositions are applied and tested. The flow of current through the covered pipe is measured after a number of vibrations and coolings, and are given in the original article in tabulated form. Figure 4 shows the relation between the current density, measured in milliamperes and plotted as ordinates and the number of vibrations, measured as abscissae. Curve (1) refers to pipe covered with cod and shirting strips impregnated with bitumen, curve (II) to petroleum bitumen applied twice to the pipe, curve (III) to jute strips impregnated with bitumen and wrapped around the pipe, and curve (IV) to a special covering called Denso.—*Dr. W. Beck. Das Gas und Wasserfach, 1933, volume 76, pages 591 to 599.*

Hydraulic Valve for Branch Mains

The hydraulic valve consists of a casting in one piece, and, in, essence, it forms a cylinder closed at the top and bottom. Near the top, two side branches are fixed, one for inlet and one for the outlet of gas. A partition extending down from the top and reaching half-way down divides the cylindrical portion into two sections of unequal size. In the larger section is a tube passing through the



tip of the cylinder and closed with a screw cap at the top, the lower end, which reaches to the bottom of the cylinder, being cut off at an angle of 45 degrees. If sufficient water is introduced, through the tube to reach

above the lower end of the partition, flow of gas is prevented. Similarly, if water is withdrawn so that the end of the partition is no longer covered, flow of gas can take place. A sufficient quantity of water is always allowed to remain at the bottom to seal the lower end of the tube and hence no gas can escape when the cap is removed to operate the valve. Where frost is feared, the valve may either be buried deeply in the ground or glycerine may be added to the water. —*L. Joly. Journal des Usines à Gaz, 1933, volume 57, page 362.*

Thermal Power and Burner Regulation

An apparatus for the measurement of the thermal power of gas flowing to a burner is shown in the accompanying illustration (figure 1).

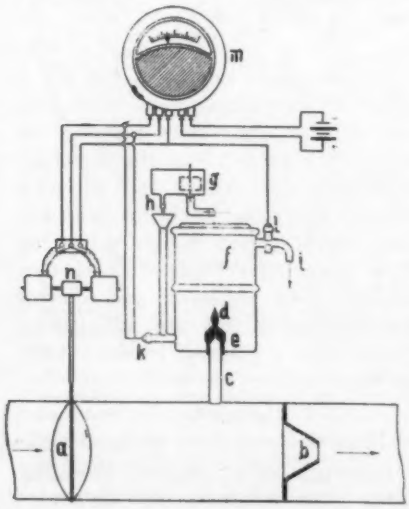


Figure 1.

A branch pipe (c) is connected to the gas line between the throttle valve (a) and the burner (b). A burner is located at the end of the branch line (c) shown at (d), the nozzle (e) of the burner having a constant cross-section area. The gas flow through the nozzle (e) is subjected to the same influences as the gas flowing through the burner opening (b), and hence depends in like manner on the density of the gas, its pressure, thermal value, etc. The heat produced by the gas burning in the burner (d) is absorbed in the body of the calorimeter (f). If the pressure of the gas is reduced, then less gas passes through the colorimeter burner nozzle (e) in proportion as through the main burner nozzle (b). If the specific gravity of the gas rises, then less gas again passes through (e) in proportion to that which passes through (b). If the thermal power of the gas decreases, whether this is due to a decrease in the content of combustible gases in the gas, to change in the composition of the gas, to change in the temperature or water vapor saturation, or if the barometric pressure changes, all these changes are manifested in the thermal power measuring apparatus in the same manner as in the burner in the appliance, which is fed through the nozzle (b). The current of water, which flows through the calorimeter, is heated to varying temperature. The heating, which takes place in the apparatus, is measured as the difference between the temperature of the water flowing in, measured at (k), and the temperature of the water leaving the apparatus, measured at (l). The temperature is indicated by means of an electrically actuated temperature-difference recording thermometer, as shown at (m). Experiment determines the thermal power at which the appliance works best. All that is then necessary is to maintain this thermal power constant, which is done by changing the throttle valve (a). If the thermal power decreases, the valve is opened and if it increases, the valve is shut. This is effected by means of a regulator in known fashion, as shown at (n). Thermal value means in this case the heating value of the gas multiplied by the quantity of gas flowing in a unit of time, hence the total calorific value of the gas flowing in unit time. The variation in the total thermal value of the gas at various pressures is shown in figure 2. —*Dr. O. Dommer. Das Gas und Wasserfach, 1933, volume 76, pages 613 to 616.*

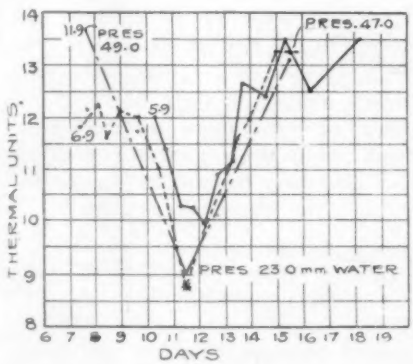
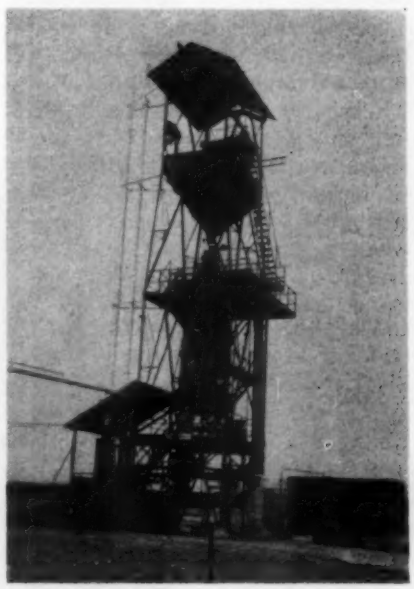


Figure 2.

Gasification With Oxygen

Large scale experiments were carried out in the experimental installation shown in the accompanying illustration for the purpose of obtaining definite answers to three important questions. The first is whether or not gasification with oxygen can be carried out on a practical scale without a liquid clinker and without too great production of clinker. The second is whether or not there is a considerable increase in the throughput of fuel, based on a unit of surface of the cross-section of the generator, as compared with generators that are operated only with a mixture of air and steam. The third is, does the consumption of oxygen in this process remain within economical limits? The experiments were carried out with lignite briquettes.



View of Experimental Installation.

The charge in the generator was about 200 kilograms per square meter. The saturation temperature of oxygen with steam used was 89 to 93 degrees C, and the ratio of cubic meters of steam to cubic meters of oxygen varied between 2.0 and 3.4. Even though the generator was not provided with a cooling jacket, there were not great difficulties due to the formation of clinker. A surprising result in these experiments was the small resistance to flow in the generator. In spite of the small size of the fuel this resistance was less than 50 millimeters of water at a gasification pressure of 20 atmospheres, a

(Continued on page 38)

Profitable Pointers

THE All-Gas-Kitchen is not a new idea for, way back in the "teens" of the present century, gas men everywhere worked pretty hard on the idea and many very successful activities were conducted to build All-Gas-Kitchens into homes. Then came a lull, and we have not heard much about "the all" type of kitchen until recently. We have always felt that the gas industry made a mistake when it forsook the idea and campaigned on single appliances, and it is most gratifying to see that the All-Gas-Kitchen is being revived under the "Modernizing" idea. Where is there a more logical field for the gas man to spend his sales promotion and advertising money and efforts than in an attack on the kitchen? The kitchen affords the gas man an ideal opportunity to plan built-in units in such a manner that he may start with a modern range and wind up with a dishwasher. Such a kitchen plan should include sink, refrigerator, water heater, incinerator and air conditioning. Think this over and plan and install a modernized kitchen in your store; advertise it and arrange to provide free planning service for your customers and watch your appliance business take on new life.

"COLD turkey" canvassing is not nearly so popular with commercial managers as it was a year or so ago. These men have found that the better way is to secure prospects through a call on present users. These calls are made as inspection calls; the salesmen for the time being service men call upon users to ascertain the condition of appliances. In this way they not only find many homes where there is a prospect of selling additional appliances or of replacing old ones, but, in nine cases out of ten, their service call, if tactfully employed, results in their securing the names of one or more interested persons. Thus the organizations using this plan may be said to be operating on "the warm turkey plan."

NEWS coming in from all parts of the country indicates that the gas man is not only going after new appliance business but that he is endeavoring to increase the revenue per meter and is making strong efforts to sell water heaters and ranges throughout the fall season; and from the way it looks now, he will continue

all winter. Another indication that the gas man is on his toes is the effort that is being made by a number of companies to revive dead services and meters. This activity in some cases is carried on by the merchandising departments, salesmen being paid a special bonus for all meter connect orders. Other companies have enlisted the support of the service department, distribution department and of meter readers. These employees are paid from one to two dollars for every service that they revive, with a like amount for each new meter connection.

AIR conditioning is the big bet of the future and the gas man who is not devoting some time to a study of the subject is overlooking his hand. It is going to be a gas job when it comes to the small as well as the larger homes of the future, to say nothing of the existing homes in which such equipment may be installed without over-burdening the home owner. The insulation people are going to give conditioned air a mighty big push in the very near future. Gas will warm the home in the winter and cool it during the three or four hot months of the summer. Think this over and start to investigate it at once.

IF you have been displaying certain appliances in a fixed location and they do not get attention or do not move out of your store, change their location. Throw a spot light on them; play them up by mounting them on a pedestal and you will find that they will move—or you might just as well put a price on them that will move them, for they are not popular, wanted items and you may as well get them off your books even if you have to take a loss.

IF your store sales are not up to your expectations, check over the methods of your sales people. See what they know about the merchandise they are selling and of what service it will be to the women who purchase it. See if they are familiar with your advertising; see if they support it by displaying and offering the appliances you are advertising. See if they are actually asking folks to buy.

WITH the cool days at hand folks are doing a lot of window shopping. Keep your windows well decorated and lighted; have them support your newspaper and direct mail advertising and your salesmen. Build

your displays to attract—get color into them, if you can—make them say "this is the place to get the gas range you saw advertised."

WHIMSICAL advertising is winning out in the gas industry. This type of advertising which is well illustrated by the reproduction herewith must be very carefully handled, for humorous advertising is of only two varieties—good or bad. This fact alone calls for a niceness in the matter of the illustrations employed—they must in a sense be over-drawn, for while it may be possible, it is very rare to include humor in an authentic vein and get the appeal that the exaggerated or caricature holds for that illusionary person known as the average American.

This advertisement is the work of one who has made a study of this type of appeal and it is our observation that he has a formula that is well worth study by other advertising men of the gas industry. It has taken a long time to secure the consent of management in the industry to get an approval of this type of advertising. For many years, when advertisements of this type were submitted to management it was promptly frowned down with "that type of advertising is beneath the dignity of the company."

WHY FIGHT A FURNACE?
A well-known editor of a prominent magazine used to have a terrible time with his furnace. On some of the coldest nights of winter upon his return home from a theater party or some social engagement he would find that the fire had gone out, which meant a troublesome trip to the basement to build a new fire, as the happiness to build have gone to bed.
This experience used to infuriate him beyond words. He would charge down the cellar stairs and begin throwing and kicking around everything within sight. He would even vent his wrath by beating the inanimate furnace with the shovel, and would usually get so riled up that it would be almost morning before he became calm enough to drop off to sleep.
One night he and his wife returned at a late hour and were cold. He had run true to form
(Clipped from Printers' Ink, 1929)
Since the original publication of this story in 1929 the well-known editor has installed a gas-heating system. He has even written an article praising the convenience and comfort of gas heat.
He got tired of fussing and fighting with a stubborn furnace and decided that life was too short to put up with the grief and inconvenience of an undependable heating system.
There's a lot of satisfaction in having a furnace that won't lay down on the job when you go out for the evening. A furnace that never needs nursing or feeding and orders its own fuel always in just the right amount.
If your experience with furnaces has been similar to the editor's why not investigate gas heat as he did? You can find out in advance what gas heat will cost. Telephone CEntral 3800 or write to the house-heating department of The Laclede Gas Light Company.
Ask for the free heating survey and estimate on the cost of heating your home with gas. This doesn't obligate you in any way. After you know the cost of gas heat, weigh the cost against the benefits, just as you would any other investment.
The LACLEDE GAS LIGHT COMPANY
OLIVE AT ELEVENTH
CEntral 3800

WE have recently heard of a number of gas companies who are conducting what they are pleased to call "cash and carry tank water heater sales." The plan is this; to secure an approved circulating gas water heater, give it a mark-up of enough to keep it out of the red and sell it for cash to all-comers. Where the customer wishes connections to be made, these are made on a time and material basis. The plan is used to meet mail-order and other types of competition where heaters are sold on the same basis, save that these plans make no provision for connections. The customer connects the heater himself or gets a plumber or heating contractor tc do it. We pass this on as a matter of information without comment as to its merits or demerits.

A GOOD salesman realizes that there is not a bit of harm in permitting the customer to think he is buying, even when he is being quietly guided by the salesman's strategy. Good salesmanshp leads the customer to a purchase rather than drives him, for he realizes that this is the way to keep him sold—besides, it is so much easier.

HERE is an advertisement from Pittsburgh that may well be used as a model for the gas man who has literature that he wishes to get into the hands of his customers, and at the same time have a record of those interested. The advertisement is very cleverly laid out, generous in white space and we will lay a bet that it proves resultful in selling the idea of getting the free information on modernizing the home with gas.

Send for this
FREE BOOK
to help you
MODERNIZE YOUR HOME
How
TO MODERNIZE
YOUR HOME WITH
GAS
Tells you just the things you want to know about modernizing . . . how to make your home a model of comfort and convenience . . . and the coupon brings it to you Absolutely Free!
AGE, after all, has nothing to do with the comfort, convenience, cosiness and healthfulness of a HOME! Plenty of houses are really out-of-date when they are brand' new. But no matter how old your home is, it can be thoroughly modern!
The Home of our Dreams . . . apart from the spiritual qualities of those who occupy it . . . is a matter of equipment to lighten labor, contribute comfort and coziness, provide gayette time for the enjoyment of life and safe-guard the health and well being of all members of the family. And in these modernizing tasks, natural gas—because it is the ideal fuel for every heating purpose—can play a vital part.
Why not make YOUR HOME as completely MODERN as possible? It doesn't cost a fortune . . . it doesn't have to be done all at once. And it PAYS TREMENDOUS DIVIDENDS of Happiness!
Send for this FREE BOOK. It costs you nothing . . . puts you under no obligation whatever. And it may very well be the means of bringing you the great pride and satisfaction of having the kind of home that everyone wants! Write or telephone your Gas Company—or send the coupon below.
(In modernizing Industrial Plants, too, the trend is toward Natural Gas.)
NATURAL GAS COMPANIES
Serving the
SEND THIS COUPON
P.O. Box 500, Pittsburgh, Pa.
Gentlemen: Please send me a copy of your free book on Modernizing.
Name.....
Address.....

ADVERTISING OPPORTUNITIES

As Gas Companies Are Meeting Them Today

By "THE COPY WRITER"

THESE are the days when committees on the Uses of Leisure Time are being formed in every community as a by-product of the National Recovery Administration. Shorter hours and bigger payrolls mean that people, theoretically at least, will have an increased amount of surplus time to spend on diversion, education or other forms of personal activity. What will be done with this time will have an important effect in many directions. It is believed that if leisure can be organized and directed into constructive channels, this will redound to the benefit of society as well as to the advantage of that planned production and buying program which has succeeded to the reputation of Prohibition as "the great American experiment."

The gas industry, as an enterprise that might be said to have invented leisure for the American housewife when the initials NRA were not really anything but letters of the alphabet, has a very definite concern in the possible trend of leisure as expressed by its customers. Through the gas company advertising, this industry is in a position to influence that trend. As a matter of fact, it cannot help doing so, either for better or worse. Suppose we look at a few recent campaigns to see what, if anything, has been done in that direction. Or, at any rate, what the possibilities may be.

PEAS - CARROTS - SPADES and CLUBS don't mix .!
Peas, carrots, spades and clubs don't mix on an afternoon set aside for bridge. Yet the family can't wait for dinner. How do some women do it? It's easy. The modern automatic gas range cooks meals by itself, even though the cook may be miles away.
The oven starts and stops itself, cooking delicious meals and keeping them hot until the family comes home. Insulation retains the heat, and during the cooking operation the proper temperature is maintained in the oven.
Even the breakfast on some modern ranges can be cooked before you arise, by automatic control of cooking top burners.
Complicated? No. Just modern advances to make your life easy. See the range today that you will use tomorrow in the kitchen of your dreams.
AUTOMATIC gas RANGE
fast
cool
clean
economical
dependable
MODERNIZE
WASHINGTON GAS LIGHT COMPANY
GEORGETOWN GAS LIGHT COMPANY
Does everything but decide the menu

"Peas — Carrots — Spades and Clubs Don't Mix!"

Almost the first thing that strikes us is an advertisement of an automatic gas range by the Washington and Georgetown Gas Light Companies with the headline "Peas—Carrots — Spades and Clubs Don't Mix!" and the illustration of four ladies presumably playing bridge. One of the foursome is obviously preoccupied with culinary details. Her mind is not on the game, as it would be if she owned a modern cooking appliance.

This is good copy of its kind, although on a somewhat conventional order—which, incidentally, is nothing against it. The question that it raises is really this: Is a bridge game the best thing that the gas company's advertising can suggest for the use of a woman's leisure time? The same question applies to golf. Or motoring. Or lying in the hammock. It is fundamental to the issues of the day and to the role of gas advertising in the future.

Now, please don't jump to the conclusion that we are trying to be moralistic. Morals, for the moment anyhow, do not enter into it. Good business does. It is one of the first functions of advertising, as we view it, to be timely. In order to be timely, it must be interesting, and in order to be interesting it must deal in human situations. We do not need to be told that bridge and golf are activities commonly indulged in by human beings. But—except for the occasional "fiend," who is the exception rather than the rule—they are not an absorbing activity. They have little if any interest for themselves. They constitute a relaxation, not an avocation, except in the occasional instances noted above.

We do not choose to labor the point; only, we do not believe that the main course of leisure time, planned or otherwise, is going to run very much over the bridge table or down the fairway. There are too many more interesting things to do. Why not use them in advertising?

Speaking of timeliness reminds us again that this should be one of the biggest years for the sale of gas house-heating. Why? Because raw fuel costs are going up, while on the other hand, many gas companies are offering new or recent reductions in the house-heating rate. We appreciate the fact that utilities generally are reluctant to mention competitors either by name or by inference. After all, even a competitor is likely to be a gas user as well, and anyhow, he probably has a vote! The utility has been altogether too often on the receiving end of harmful publicity not to be somewhat sympathetic in regard to the feelings of other interests in the field.

and direction, it treads on the soft corns of an opponent soliciting his share of the customer's dollar. The greatest service, bar none, that advertising can render to the public is by the complete and persuasive presentation of opposing claims which bring out the facts, the whole facts and, incidentally, nothing but the facts.

So we voice three cheers and a tiger for the regional advertising of the "Natural Gas Companies Serving the Pittsburgh Area" which arrestingly announces that "Coal Prices Are Going Up! But Gas Heating Costs Are Lower." There is "No Doubt About It . . . . 1933 Will Be a Gas Heater Year." And 1934,

One Simple Change
that Modernizes the Home
GAS HEATING
10 ADVANTAGES
Made possible by Gas Heating
1. Low equipment cost
2. Low installation cost
3. Long life
4. Silent operation
5. No handling of fuel
6. No ordering in advance
7. Paid for after using
8. Entirely free from dirt
9. Easy to turn on
10. Easy to control
"OUR greatest home convenience," hundreds of thousands of our domestic gas consumers say of Gas Heating
With Gas Heating a control valve or a dependable thermostat is their fire tender or furnace man. These homes are never overheated with wasted fuel—never chilly from neglected fires. The temperature is readily maintained, whole house warmth, in any weather.
Today the almost universal acceptance of Gas as the preferred fuel is chiefly for its cleanliness and convenience It comes ready made and ready to use — piped directly to the gas heating appliance The outstanding preference for Gas fuel is convincing proof that Gas is the modern fuel for California homes and California climate
Why not get the facts about Gas Heating as these customers of ours have done? Once you do this you too, will install Gas Heating in your home for the coming winter
BUY NOW—Before prices advance
Cost of all materials that go into gas appliances have gone up. Labor costs, too, have risen. But prices have not yet risen on gas heating appliances. Be wise—buy gas heating appliances now
SEE YOUR DEALER OR THE
P · G · and E ·
PACIFIC GAS AND ELECTRIC COMPANY
Owned · Operated · Managed by Californians

An Ad Featuring The Buy-Now Aspect.

This is very nice and considerate of the gas company, and we are not advocating any war to the knife when we respectfully observe that every advertiser has not only a right but a positive duty to push the unique and timely advantages of his own product even though, by inference if this kind of advertising keeps up. With gas, "You Can Know a Year in Advance What Your Fuel Costs Will Be." No other fuel can make this claim.

This is the only advertising of its kind that we have seen thus far. Other gas companies, however, are capitalizing on rising costs of equipment, notably the Pacific Gas and Electric Company, which includes this statement in all of its house-heating copy: "BUY NOW—before prices advance. Cost of all materials that go into gas appliances have gone up. Labor costs, too, have risen. But prices have not yet risen on gas heating appliances. Be wise—buy gas heating appliances now."

Another thing that we like about the P.G. & E. Campaign is its listing of "10 Advantages made possible by Gas Heating." These are—1. Low equipment cost. 2. Low installation cost. 3. Long life. 4. Silent operation. 5. No handling of fuel. 6. No ordering in advance. 7. Paid for after using. 8. Entirely free from dirt. 9. Easy to turn on. 10. Easy to control. It has been our theory that terse, expressive listings of this type are a great convenience both to the advertiser and to the reader of advertising. We would like to see the A.G.A. or some other clearing house of gas company advertising, make a collection of such points from the advertising of all gas appliances and services. A collection of this kind would make an invaluable copy-book and might even serve to simplify the too loquacious pieces of copy that sometimes appear, with a consequent increase in effectiveness and a saving of space.

How to Cure Verbosity

Verbosity can also be cured, as the Chinaman said, by the use of pictures. But the best thing of all is a good idea. A striking thought which makes your audience say, "I never looked at it that way before" is often sufficient to render superfluous nine out of the ten words you might otherwise have uttered. There are two such ideas in the recent advertising of the Philadelphia Gas Works: one on cooking, the other on water heating. Unfortunately, in one case at least, nobody was around to tell the copy writer when to lay off, the result being that the original inspiration was nearly smothered in a welter of verbiage. This is the range advertisement with the arresting headline: "Why Limp Along with an Old-Fashioned GUESS RANGE When It's Easy to Own a Modern *Automatic* GAS RANGE?" Equally stimulating to the buying urge is the headline of the water heater message with the inquiring

suggestion "How Often You Could Use HOT WATER If You Had It On Tap All the Time!" There follows a series of twenty—count 'em! —cartoon cuts illustrating an enormous variety of hot water applications. The effect is not as involved as it sounds. Although not of the comic-strip school, it gets the attention and holds it.

In other places, however, the comic strip has been a boon to the advertising technician looking for new attention-getting devices. The fact that it is being overdone in many instances need not be seriously considered at this time. There is life in the old dog yet, and will be for a considerable period of time. Comic-strip technique is usually found in two forms. One is the sequence of "talking" pictures telling a complete story in the form of a dialogue between two characters. There are several good examples of this among gas companies—one especially by the Public Service Company of Northern Illinois, under the caption "Junior Comes Clean." There is no company signature. Although there is something to be said on both sides, we confess our preference for seeing this type of comic-strip advertising confined to house organs, direct mail, and other advertising publications for which it is peculiarly suited.

There is a second form, however, which is highly popular, and in our judgment deservedly so. This goes by the trade name of "balloon" copy, derived from the fact that the message is conveyed by means of conversational balloons issuing from the mouth of one or more characters shown in a realistic situation. The best of these advertisements uses a photographic treatment on which the running text is superimposed; but effective use of line drawings has also been made by the B. C. Electric Railway Company's gas department and by the Milwaukee Gas Light Company. Following are a few sample conversations:

1—"Gas heating must be wonderfully convenient but—" "My dear, you'll be astonished how cheap it is!"

2—"Gracious, did all that dirt collect in the filter?" "Yes, madam; but for your air-conditioning gas furnace you would have breathed all that dirt into your lungs."

3—"Don't you think, dear, this gas bill is rather high?" "Remember, John, we use gas refrigeration, we cook three meals a day on our gas range and operate a gas water heater."

JUNIOR COMES CLEAN
MONDAY
JUNIOR ANDERSON! YOUR HANDS ARE A SIGHT!
BUT I'VE JUST WASHED THEM, MOTHER
...AND DON'T FORGET BEHIND YOUR EARS
BUT MOTHER, THE WATER'S COLD
JOHN, WE'VE GOT TO DO SOMETHING ABOUT HOT WATER NOW THAT THE FURNACE IS SHUT DOWN. NO WONDER JUNIOR WON'T WASH CLEAN
SATURDAY
Now the whole family's hot water problem is permanently solved. They've installed an automatic gas water heater. (Only $5 down.) Plenty of hot water always runs from the faucets. This new convenience costs just a few dollars a month. Get the facts from your Public Service Store or your LOCAL PLUMBER. Automatic heaters as low as $38.50 (plus installation).

An Example of the Comic Strip Principle.

Sweet are the uses of advertising. The sweetness, however, is usually in proportion to its application of current trends. Certain gas companies, as we have tried to show, are giving healthy heed to this timely and time-tried principle. Now, if ever, is the time to trim our sales to the wind and tide.

Unique Record in Handling Flood Emergency

(Continued from page 17)

At 9:30 Saturday evening, it was extremely difficult to get men and materials, especially since the crews had to be brought 75 miles from Colorado Springs over roads made virtually impassable by the flood. After making numerous detours, enlisting the aid of highway workers in making road repairs over impassable spots and finally driving across a railroad trestle into Denver, one large crew arrived at the break at 3 A.M. and another about daylight. The water was still flowing several feet deep along the line for a distance of about a quarter of a mile.

After finally getting in touch with water department officials, the workers secured permission to blow out a section of the canal so that a cofer dam could be built to divert the water. The dam had just been completed Sunday afternoon and preparations were being made to start work on the line when a second cloudburst came down and washed out all the earlier work. Starting the job again, crews cut down a huge tree for use as the foundation, and built another stronger dam of iron pipe and lumber. Then, another dam was constructed at the other break.

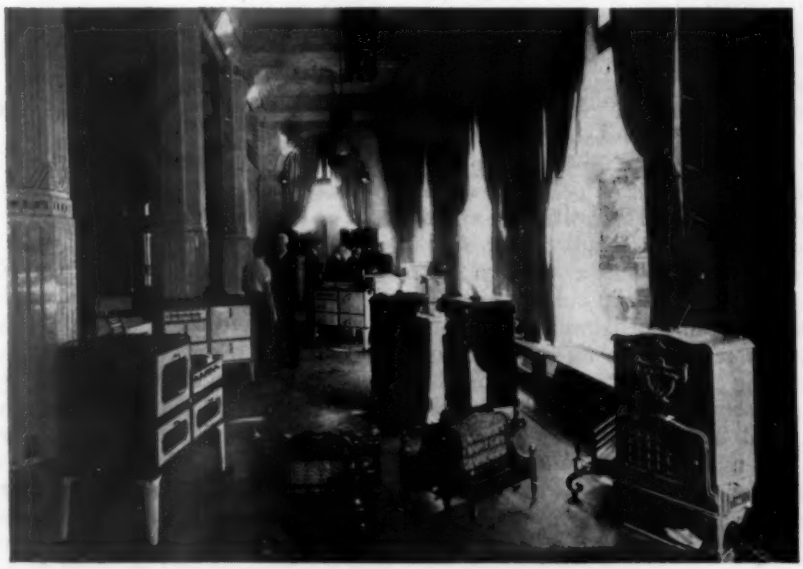
Finally, at 2 P.M. Monday, the men were able to start repairing the four joints of washed out and loosened pipe. Because water and gas were running from the break in the pipe, it was impossible to use acetylene welding equipment and extremely difficult to do the job even with electrical equipment. For hours, the men lay on their backs in the water, only their heads above the surface, in an effort to mend the breaks.

The work finally completed, it was necessary to blow out the 20 inch line, which had become filled with mud and dirty water. One joint had to be removed about a mile below the break toward Denver to make the first "blow-off." The debris in the pipe filled a hole about 22 feet long, 6 feet wide and 6 feet deep.

The final step was to blow out the line into Denver at the town border station. It took about three hours to remove all the water collected in this section. The valves having been closed above the original break, the line was again in perfect condition after the last section was blown out. The precautions taken prevented any further delay in service due to dirt, water or air.

10,000 Prospects In Three Nights

By W. B. STODDARD



How the Gas Company's Display Floor Was Arranged for the Occasion.

ONE OF THE most outstanding examples of the hearty cooperation of a public utilities company and merchants selling gas appliances, was National Gas Appliance Week in Tulsa, Okla., or, as its sponsors preferred to call it, "Home Heating Week"—a period devoted to the health, comfort and convenience of all Tulsans, and intended to familiarize them with the latest, most improved methods, greatest convenience and maximum comfort to be derived from gas heat.

Speaking for the Gas Company, H. Jennings Young, director of new business said: "We work continually with the merchants of Tulsa handling gas appliances, and our ads always carry the notation 'See us regarding your heating problems. See your regular dealer for the appliances needed.'

"During the week of November 2nd all the leading hardware, furniture and house-heating establishments combined in a huge publicity drive to put over the idea of heating the homes and business establishments of the citizens with gas. The newspapers gave hearty support, getting out a special section on Home Heating Week several days in advance of the opening of the campaign. In this section all of the merchants advertised their special brands of radiant heaters, circulating heaters, and gas furnaces, as well as all manner of fireplace goods. We of course took ample space in this edition, using the slogan 'Let's be comfortable this winter'. In return for the advertising the newspapers gave good reading notices to each firm, mentioning the gas heating appliances carried by them.

"All the stores had special window and interior displays, and in addition, all of them had one or more of their heating appliances on exhibition on the floor of our gas salesroom. Each appliance was tagged with the name of the firm, and most of them had little stacks of folders, supplied by the manufacturers, describing the heating apparatus, placed conveniently near for all who wished them.

"Each merchant gave away a heater during the course of the week and this of course focused general attention on gas appliances. We had 50,000 tickets printed and distributed them among the stores. The firms gave out these tickets to all their customers. At the end of Gas Appliance Week we held a three-nights' gala affair at our offices. On each of these nights we had an orchestra to furnish music, and the managers of all the different stores were on hand to help us in receiving the guests. A

It's Autumn Time

—When Thoughtful People Think of Winter Heating

NOW Is The Time to Install Gas Appliances

In Tulsa this week your local merchants are featuring the best equipment during

GAS APPLIANCE WEEK

Visit the Oklahoma Natural office and your local dealers where the displays will be held this week. Competent men will be at your service to advise you how to obtain unexcelled gas service at a remarkably low cost.

"Let's be comfortable this winter."

Good GAS HEAT for COMFORT ECONOMY CONVENIENCE and HEALTH

Good gas heating is no longer a luxury. It is a necessity. It is essential for health, comfort and cleanliness. At Oklahoma Natural's new low rate you can enjoy luxuries of a home at the price of a necessity, which, of course, is surprisingly inexpensive.

Bring your heating problems to the display room this week. Your local merchants and Oklahoma Natural will feel it a privilege to be able to assist you in making your home a haven.

Gas Is Cheaper Now!

OKLAHOMA NATURAL GAS CORPORATION

"Dependable Gas Service"

W. H. Bagley, Tulsa Manager

Seventh and Boston Sts. Telephone 3-4161

A Specimen of One of the Newspaper Ads Used.

crowd of more than 10,000 people visited us on the three nights, heard the methods of gas heating explained, examined the different appliances, and hoped to become the free possessor of a gas heater. Seven stoves were given out each evening, and considerable excitement and enthusiasm prevailed. Never before had we been able to present to so many people at one time the benefits of gas heating—whether it be for a single room with a radiant heater; an apartment with a circulator; or an entire building with a modern gas furnace. We have in our employ two expert heating engineers, who are always ready to go to any home or building to make estimates of the equipment necessary to properly heat it—and this service is entirely free. These men were on hand the three gala nights and gave short talks, in addition to speaking informally with scores of householders each evening."

A Great Success

M. C. Hale, veteran hardware dealer, said: "In the thirty years in which I have been in business here I never saw anything like the enthusiastic response made by our people to Gas Appliance Week. The volume of sales made today was undreamed of 30 years ago."

In addition to the comfort of gas heat, style is now being stressed. "There is no reason," said Arthur Freed, manager of the gas appliance department of Freed's Furniture Store, "why the heater should not fit into the period decoration of a room just as much as furniture or draperies. We can furnish them in Colonial, Early American, Chippendale and all period types. Accessories such as andirons, fire screens and tools are as essential to the finished appearance of a gas heater as they are to a wood-burning fireplace, and dealers should stress their decorative effect and strive to sell a complete ensemble."

Fred S. Luebker, store manager for the Dickason-Goodman Co., is another firm believer in the pushing of fireplace fixtures, and a living room fitted up by this firm in honor of Gas Appliance Week showed a complete ensemble of fireplace goods surrounding the gas fireplace. They had an exceptionally fine floor display of circulating heaters and gas furnaces, and overhead a big banner urging all to visit the big exhibit at the Gas Company and learn how the home can be comfortable and evenly heated by gas.

Notes on High Pressure Gas Distribution

(Continued from page 20)

The measurement of main from the location of the equipment should then proceed to the end of the subtransmission main.

Types of Consumers—For design purposes the method of distinguishing consumers is entirely different than that followed for accounting or rate making practices when the system is in operation. It is quite common in towns and villages to find that the business and residential sections are mixed, since stores frequently have apartments on the floors above the ground. For design it is desired to know the demand on each street between intersecting streets, regardless of the purpose of use. Securing the exact number of potential consumers is a difficult matter and one requiring canvassing every building, which is undesirable so far ahead of actual construction. Arousing a desire for gas service too far in advance of actual establishment causes the desire to wane and it is more difficult to re-establish than to originate. A practical substitute for the number of consumers is the quantity of buildings and their average stories on each street between intersecting streets. Predictions based on the quantity and height of buildings will be within the accuracy possible when estimating loads, as villages and towns vary widely in demand. Such a basis for load prediction should not be used when re-designing existing systems, as the actual number of meters are then obtainable.

Distinguishing Between Customers

While business and residential consumers may be grouped, it is well to distinguish between them and industrial or institutional sections. In these two latter sections the distance between each consumer should be measured and the exact nature by types of products rather than potential demand noted.

Some suburban territories have seasonally occupied sections. The approximate boundaries between seasonally and permanently occupied residential sections should be noted, as the demand in the seasonally occupied sections is low especially where the houses are closely grouped. Where the seasonal residences are of the large house type on estates the demand per consumer will be found high and design will be affected due to the considerable distances between buildings.

Limits of Field Survey

Boundaries of Survey—The approximate limits of the field survey are set during the reconnaissance. The stopping point of measurements on the individual streets is not usually designated by the reconnaissance engineer but is left to the field crew, with certain restrictions. A desirable method for determining this point is to select some average distance per building and until this average is exceeded only the total length of main and total number of buildings is recorded; after this the measurements will be given between each building and again a stopping point must be selected. This latter figure should be considerably in excess of that which is economically desirable, so that the actual end point on each particular street may be determined in the drafting room rather than the field. For instance, in this latter condition a maximum average for individual measurements may be selected as 200 feet per dwelling. The distance between some of the dwellings may be considerably in excess of 200 feet due to greater concentration of buildings in particular portions of a street, but measurements will be continued until the average of the individual measurements is in excess of the 200 feet. Even then judgment must be used, as where only one or two more buildings remain it would be well to include the measurement to them.

All measurements to buildings should be taken to the side of the building farthest from the source of gas supply so that the main will be available for a service regardless of the location selected later.

(Continued in December issue)

Radiant Heater Sales Campaign in Pittsburgh More Than Reaches First Base— *It Reaches Home!*

IN a community which this year rounds out a half century of the domestic use of natural gas, employees of the three local natural gas companies have proven that the saturation point of space heater sales is far from reached and that the public can be put in a buying mood if active enough selling methods are employed.

An intensive 30-day campaign recently conducted exclusively by employees of The Equitable Gas Company, The Manufacturers Light and Heat Company, and the People's Natural Gas Company, of Pittsburgh, has resulted in the sale of more than 14,000 of one make of radiant heater. The probable annual load requirement of these heaters is estimated at about $96,000 of which a large part will be added load. Some heaters were purchased to replace older appliances although many of these were so old that they were seldom, if ever, used.

The activity exceeded by more than 200 percent the quota of 4,500 agreed upon by the three companies before the campaign was started. Each company took a quota of 1,500 heaters at the start.

The total of employee sales was for the Humphrey Radiantfire and does not include hundreds of other appliances sold or the decided pick-up in dealer and department store sales resulting from an intensive joint newspaper and radio advertising campaign carried on by the three companies, primarily to back up the employee selling activity. Radio advertising was confined to one-minute statements in conjunction with weather reports. These were made at 6:15, 7:30 and 11 o'clock each evening of the first week, and two each evening for the remaining three weeks.

While advertising was designed to encourage the sale of all types and prices of radiant heaters by dealers as well as company employees, a leader was used in the $16.00 Humphrey heater at a special price of $9.85, without the make being identified. Thousands of other heaters were sold as a result of the whirlwind activity.

NOW Outstanding Values in
RADIANT HEATERS
DURING SPECIAL SALE BY GAS APPLIANCE DEALERS AND YOUR GAS COMPANY
NATIONALLY ADVERTISED
10 RADIANTS
FULL SIZE
Here's a Typical Value
REGULAR PRICE $16.40 installed
SPECIAL SALE PRICE
$9.85 cash
Or $1.00 First Payment and $1.17 a month for 8 months on your gas bill.
Price includes installation where gas line is immediately available
Never before reduced in price
Illustrated above is one of the many bargains offered during this Special Radiant Heater Sale by Gas Appliance Dealers and Gas Companies a nationally advertised Radiant Heater, full size, with ten radiants, never before sold for less than $16.40 installed—now only $9.85—a saving of 40 percent.
For chilly evenings and mornings, before the furnace is on the job—anytime you want satisfying warmth instantly here it is at the touch of a match.
The Radiant Heater illustrated is attractively finished in rich oxidized brass. It is 21" high, 24¼" wide, 7" deep, fits any fireplace from 22" to 36" wide and is equipped with 4" vent so it can be used in any room whether it has a fireplace or not!
This super-bargain is only one of the many real values in this special sale which continues for a short time only Buy from your dealer or Gas Company today!
THIS ADVERTISEMENT SPONSORED BY
The Equitable Gas Co.
The Peoples Natural Gas Co.
The Manufacturers Light & Heat Co.
The T. W. Phillips Gas & Oil Co.
IN THE INTEREST OF GAS APPLIANCE DEALERS

The Ads Told a To-The-Point Story

Advertising was conducted jointly by the three companies but actual selling activities were carried on independently in competition for a cup awarded to the company making the largest total sales. The cup was won by The Peoples Natural Gas Company which sold 5,777 heaters.

The intensive organization set-up with facilities for a constant check on lagging participation, which was used by The Peoples Natural Gas Company, is an example of the methods used to encourage maximum employee participation.

Early in the preliminary arrangements quota were established for each of the company's districts, according to the number of employees, number of meters and general business conditions in each territory. These quotas totaled a company

quota of 2,403 instead of the 1,500 quota which was accepted at first by all of the companies.

The campaign was introduced with a meeting of field foremen and agents after which these men returned to their respective districts and formed sales organizations. Each divisional organization was then visited from one to three times and the employees instructed in the plan of the campaign and selling methods. While this was going on meter readers distributed a folder to all consumers describing the special radiant heater offer and explaining terms.

The company centered the campaign around a mythical around-the-world airplane flight with each employee as a pilot and every ten pilots under a squadron commander whose work it was to keep a close check on the progress of each of his pilots and stimulate activity whenever necessary.

Keeping Progress Record

Daily bulletins and a world map with a tiny airplane for each district, indicated the relative standing of each district from day to day. Reports were made by all employees at 10 a.m. each day and these were consolidated daily at headquarters.

In addition to sales commissions, weekly cash awards were made to the three highest in sales. Grand cash prizes were given to the six sales leaders in the company at the end of the campaign. The office or plant organization making the largest total sales also received a cash prize which was distributed among employees of the division according to the total sales made by each. In this manner the campaign was not permitted to lag, recognition was given for weekly activity as well as total individual sales for the campaign, and every employee who made a sale was "in the money" at the end in proportion to the sales he had made. Certificates of achievement were awarded to each company district which exceeded its quota.

The actual total of sales for the one make of radiant heater was 14,094 of which The Equitable Gas Company sold 3,626; The Manufacturers Light and Heat Company sold 4,691, and The Peoples Natural Gas Company sold 5,777.

The detailed campaign for the Peoples Natural Gas Company was worked out by Ketchum, MacLeod and Grove, Inc., Pittsburgh, the advertising agency which serves all of the companies in a year-around joint advertising and public relations program.

Oils and Paints for Protection of Holders

(Continued from page 15)

10 Million cu. ft. Holder "Oil"

	1st Year	*2nd Year*	*3rd Year*	*4th Year*	*5th Year*
1st Lift	500	250	250	250	250
2nd Lift	500	250	250	250	250
3rd Lift	500	250	250	250	250
4th Lift	500	250	250	250	250
5th Lift	1,000	500	250	250	250
Total	3,000	1,500	1,250	1,250	1,250

Total, 8,250 gallons Oil	$1,938.75
Labor, 3 man-days per dip @ $6.00 per man-day	90.00
Grand Total	$2,028.75

10 Million cu. ft. Holder "Paint"

(Based on 5-Year Period)

1st Lift	53 gallons primer @	$2.10 per gallon	$111.30
	45 gallons finish coat @	2.00 per gallon	90.00
	63 man days @ $6.00		378.00
2nd Lift	66 gallons primer @	2.10 per gallon	138.60
	56 gallons finish coat @	2.00 per gallon	112.00
	79 man days @ $6.00		474.00
3rd Lift	88 gallons primer @	2.10 per gallon	184.80
	75 gallons finish coat @	2.00 per gallon	150.00
	105 man days @ $6.00		630.00
4th Lift	88 gallons primer @	2.10 per gallon	184.80
	75 gallons finish coat @	2.00 per gallon	150.00
	105 man days @ $6.00		630.00
5th Lift	88 gallons primer @	2.10 per gallon	184.80
	75 gallons finish coat @	2.00 per gallon	150.00
	105 man days @ $6.00		630.00
		Grand Total	$4,198.30

Gasification With Oxygen

(Continued from page 29)

generator load of 900 kilograms per square meter and a fuel bed depth of three meters. Consumption of oxygen per kilogram of fuel, having a maximum heating value of 5000 kilogram-calories, was 0.155 cubic meter, while 1.10 kilograms of steam were used and 1070 cubic meters of gas of 4200 kilogram-calories heating value were obtained. A particular advantage of the process is that only 0.15 cubic meter of oxygen need be used, compressed to 20 atmospheres, to obtain one cubic foot of coal gas at the same pressure.—*Dr. Drawe. Das Gas und Wasserfach, volume 76, 1933, pages 541 to 545.*

Hand Delivery of Bills and Advertising Matter

The proper distribution of advertising matter has been looked upon as a problem where hand delivery of customers' bills has been resorted to since the increase in postal rates.

One utility has solved this problem by continuing to place bills and stuffers in envelopes in the same manner as though the bills were to be mailed through the post office.

This plan permits the placing of the bill in the customer's mail box (where it does not interfere with delivery of regular mail) or placing the bill under the door. The envelope being sealed, there is little chance of the contents not reaching the person addressed. There is also little likelihood of the amount of the bill being disclosed to others as is the case where bills are left without being placed in envelopes.

The advertising matter also reached the customer without relying on the employee, as is the case when such material is handed to him loose with instructions to leave a circular with each bill delivered.—*A. G. A. Convention, Accounting Section.*

NEWS *of the* GAS INDUSTRY

Consolidated Again Receives Award

For the second time within three years the advertising of the Consolidated Gas Company of New York has received the "Socrates' High Award," which is made annually by Public Utility Ad-Views, a publication devoted exclusively to public utility advertising.

In making the announcement of the award, which covers the period from October 1932 to October 1933, Public Utility Ad-Views stated that "special recognition should be given at this time to the men who have made the excellence of Consolidated Gas' advertising possible. To Henry Obermeyer, assistant to the vice-president, in charge of the Advertising Bureau, to Cyril Nast, Manager, and to the members of Consolidated Gas Advertising Bureau, Socrates and his staff extend their heartiest congratulations."

New Gas Well in Indiana

The Indiana Eastern Gas Corporation drilled in another 9,000,000 cubic foot well Oct. 5 in the Francisco field east of Princeton, Ind. The Knox Engineering Corporation, now a subsidiary of the Indiana Eastern Gas Corporation, brought in the well, which by actual gauge was nine and a quarter million feet. A party of company officials from Rochester, N. Y., witnessed the shooting of the well. M. J. Dewey, president of the Indiana Eastern admitted that plans rapidly were being completed whereby another big line is to be constructed out of Southern Indiana to points in the north part of the state. It is announced also that the company has acquired control of the Triangle Oil & Gas Co., properties and production, near Washington, Ind.

Time for Deposit of Bonds Extended

The Mobile Gas Service Corporation organized for the purpose of taking over the Mobile Gas Company extended the time for deposit of bonds under the plan of reorganization from Nov. 1 to Dec. 15, 1933, according to announcement by W. W. Winter, vice-president of the new organization.

More than $850,000 in bonds have already been deposited with the Merchants National Bank of Mobile, Mr. Winter said. The plan of reorganization of the Mobile Gas Company was worked out by Stone & Webster Corporation, nationally known operators of public utilities, with the aid of the First National Bank of Mobile and Merchants National Bank of Mobile. The plan has received favorable consideration by the Alabama Public Service Commission and the U. S. District Court.

New Gas Company Incorporated

Prine Gas Co., Monroe, La., has been incorporated to operate in the gas and petroleum fields, with J. C. Prine, Mobile, Ala., president; Sam R. Humble, Mangham, La., vice-president; Charles H. Godwin, Monroe, La., secretary and treasurer.

Interest on Consumer's Deposits to Be Credited on December Bills

Interest on consumer's deposits placed with light, gas and water utilities as a guarantee for payment for service, must be credited on the December bills of customers under an amendment to the general rules governing utilities announced recently by the Alabama Public Service Commission.

The interest rate prescribed is not less than six per cent and is payable when the deposit has been placed with the utility for a period exceeding six months.

The deposits are required by the utilities in varying amounts, depending upon the probable monthly consumption by the customer.

Kings County Lighting Co. Has New Gas Rate

The New York Public Service Commission has approved a new rate which will reduce the cost of gas to space heating customers of the Kings County Lighting Co., which serves gas in the Bay Ridge, Bensonhurst, Borough Park, and Bath Beach sections of Brooklyn. This will mean a saving of about $18,600 annually to 400 customers.

The new rate is applicable to the heating of houses or buildings solely by gas during a contract year, either by space heating or by central installation of a type approved by the company. This rate is available only to applicants for such service as guarantee to the company a revenue of not less than $80 under the rate during the heating season, which is between October 1 of one year and May 31 of the following year.

A water-heating installation of the customer may also be supplied under this rate in premises heated solely by gas and all other gas equipment used for domestic purposes in private residences heated solely by gas, may be supplied under this classification, which became effective as of October 1. The new rate for space heating is $1 for the first 500 cu. ft. or less of gas per meter per month and 9½ cents per hundred cu. ft. for the next 2600 cu. ft. per month and 6½ cents per hundred cu. ft. for all over 3100 cu. ft. per month. The minimum charge is $10 per meter per month, or any part thereof, for each of the months from October through May, both inclusive, until such time as the customer's total payments for gas service under this rate shall equal $80. During other months the minimum will be $1.

Convention Calendar

December

7-8 Purdue University's Ninth Annual Conference on Welding, Lafayette, Ind.

October, 1934

Week of Oct. 29, 1934, American Gas Association 16th Annual Convention, Atlantic City, N. J.

Baltimore Gas Sales Increase

Total sales in cubic feet of gas for industrial and commercial purposes during the first eight months of this year and last year are reported by the Consolidated Gas, Electric Light & Power Co., as follows:

	1933	1932	Per Cent Increase
First six months	1,309,000,300	1,401,920,700	6.63
July	195,483,100	164,921,800	18.53
August	195,656,700	160,301,900	22.06
	1,700,140,100	1,727,144,400	1.56

Ninth Annual Conference on Welding

Purdue University announces its Ninth Annual Conference on Welding to be held at Lafayette, Indiana, on December 7-8, 1933. This conference will be held under the direction of the Engineering Extension Department and the Department of Practical Mechanics, with the manufacturers of welding equipment cooperating.

The conference will include talks, exhibits and demonstrations, and is open to all manufacturers and welding shop operators of Indiana and neighboring states. Programs will be ready about November 25th.

Address inquiries to Engineering Extension Department, Purdue University, Lafayette, Indiana.

C. J. Merritt Awarded A.G.A. Scholarship

C. J. Merritt, a native of Danville, Ind., who was graduated in 1930 from the School of Chemical Engineering at Purdue University, has been awarded the American Gas Association Scholarship of $350 for the coming year, it was announced recently by Prof. R. B. Leckie, head of the gas engineering division of the School of Chemical Engineering. Under the terms of his scholarship he will spend the present academic year in a research program designed to develop new methods of metering large volumes of gas. Merritt was chosen for the scholarship this year because of his outstanding work in the field of gas research. A committee composed of Dean A. A. Potter, Prof. H. C. Peffer and Prof. Leckie made the award.

During his senior year at Purdue, Merritt worked on a research project on the use of gas in house heating, with the Indiana Gas Association providing the funds for his work. Following graduation he went to the American Gas Association Laboratory in Cleveland and spent three years on research projects with this organization, a year of which was at the U. S. Bureau of Standards in Washington. He will continue his studies at Purdue in the Graduate School while working under terms of the scholarship this year.

Potash Industry Plans to Use Natural Gas

The El Paso Natural Gas Co., El Paso, Texas, is planning to construct a line to supply natural gas to assist in the development of the potash industry now being planned by the Potash Co. of America. The plant will be constructed in Eddy County, north of Carlsbad, N. M.

Foster Appointed Industrial Advisor of Gas Appliance Industry

Charles K. Foster, vice-president of the American Radiator Standard Sanitary Manufacturing Corp., has been appointed industrial advisor on the Gas Appliance and Apparatus Industry.

Mississippi Gas Companies Not to Pay Back Taxes

The Mississippi tax commission has been permanently enjoined from collecting more than half a million dollars in back taxes from four natural gas pipe line companies by a special three-judge federal court.

The court's decision was handed down in the case of the Interstate Natural Gas Company, but applies to the other firms against which suits are pending, tax officials said.

Other companies involved in the litigation are the Southern Natural Gas Company, the United Gas Public Service Corporation and the Memphis Natural Gas Company.

The commission sought to recover a total of $543,805 from the four companies, on the ground that the companies were foreign corporations and therefore not entitled to a five-year tax exemption granted each of them.

The gas companies, which operate pipe lines through the state, attacked the constitutionality of the back tax assessments and contended that such assessments violated a contract held by each with the state government.

Gas System to Be Extended

Engineering studies and estimates which will provide for rebuilding a part of the gas distribution system of McAlester within the city limits are being made by the Public Service Co. of Oklahoma, according to Harry W. Pitzer, district manager of the company.

More than 65,000 ft. of new pipe has been purchased to replace some of that now in use. About 50 people will be employed to install the gas lines.

New Haven Gets New Rate

A new residential rate for house heating has been made effective, as of October 1, by the New Haven Gas Light Co. All gas used over 3000 cu. ft. a month is 6 cents gross, 5 cents net per 100 cu. ft. A budget plan for paying heating bills allows the estimated season's consumption to be spread over eight months.

New Orleans Gas Revenues Up

Gas revenues of New Orleans Public Service, Inc., for the first six months in 1933 was $752,324 as compared with $671,946 for the like period of 1932.

Officials From Rochester Company Inspect Indiana Gas Wells

Officials of the Indiana Eastern Gas Corporation, headed by M. J. Dewey, president, and Senator Fred J. Slater of Rochester, N. Y., accompanied by a group of Rochester capitalists, were in Indiana recently inspecting the mammoth gas well drilled in by the Knox Engineering Corporation in the Francisco field east of Princeton. At that time it was announced that the Knox Engineering Corporation, headed by J. E. Bauer, president, of Vincennes, Ind., and the Indiana Eastern Gas Corporation had been merged.

Pawtucket Gas Rates Revised

The Pawtucket Gas Co. and the Blackstone Valley Gas & Electric Co. have filed with the Rhode Island Public Utilities Commission a revision of rates for gas heating, applicable to gas used for cooking, heating, and water heating in buildings heated by gas.

The revision of rates changes the amount of gas included in the different blocks and reduces the rates. Savings of 55 cents a month on 2,000 cu. ft. of gas, $2.67 on 50,000 cu. ft., and $15.67 on 200,000 cu. ft. are effected.

This is the third time within a period of less than three years that the gas heating rate has been revised downward.

"EMERGENCY AND RESUSCITATION CREW" THE LACLEDE GAS LIGHT COMPANY, ST. LOUIS, MISSOURI.

These men direct the activities of other employees of The Laclede Gas Light Company at fires and on cases where artificial respiration is administered.

Standing—Left to right: Andy Day, Edwin Dowley, Raymond Evans, Chas. H. Wiley, Superintendent South District, H. M. Gerken, E. H. Goetsch, Superintendent North District, A. J. Windey, E. L. Ernst and George Herbert.

Seated—Left to right: John Lee, J. D. Sowash, John Davis, W. M. Stanton, John J. Barada, Director of Safety, Thomas Morley, Herman Berendes and E. Belaey.

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SPRAGUE CAST IRON GAS METERS

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low, medium, and high pressures.

Accurate in Measurement. Economical in Service.

THE SPRAGUE METER CO.

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Guaranteed to always run uniform. It has been used by Gasworks all over the world for over 50 years. We offer same from a shipping point most conveniently located to your works. Shipped in bulk or bags.

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THE PERFECT READY MIXED OXIDE

For Gasworks having no facilities to mix their own Sponge we offer our celebrated "Lux Sponge," guaranteed efficient for Coal or Water Gas.
Samples upon request.

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ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

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Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

Gas Company Statistics For August 1933

DURING the first eight months of the current year revenues of manufactured and natural gas utilities declined 7 per cent, dropping from $493,186,100 in the first eight months of 1932 to $458,258,600 in the corresponding period of 1933.

The manufactured gas companies reported revenues of $252,545,500 for the first eight months, or 9.2 per cent less than for the same period of the preceding year, while revenues of the natural gas utilities aggregated $205,713,100, a decline of 4.3 per cent.

Sales of manufactured gas reported for the eight month period totalled 234,689,600,000 cubic feet, a loss of 6.7 per cent, while natural gas sales were 557,234,600,000 cubic feet, or approximately the same as for the corresponding period of the preceding year.

This decline in sales and revenue appeared to characterize practically all sections of the country served with manufactured gas. In regions served with natural gas however, the decline in sales and revenues was relatively much less severe, owing to marked expansion in sales of gas for industrial uses.

In New York State, sales of natural gas for industrial uses increased 50 per cent during the first eight months of 1933, while in the states of Pennsylvania and Ohio the gain in this class of business was 8 per cent and 23 per cent respectively. Some states in the Mid-Continent area also reported pronounced gains, industrial sales of natural gas in Oklahoma gaining 23 per cent during the eight month period.—*Paul Ryan, A. G. A. Statistician.*

Public Service Company of Indiana Cuts Dividends

Directors of the Public Service Company of Indiana, at their last meeting made a 50 per cent cut in dividends on the company's 7 per cent prior preferred stock. The company serves many Indiana cities with gas and light. The cut was made necessary by changed conditions, including increased taxes, increased operating costs on account of the NRA and recent rate reductions, the directors announced.

The reduction in revenues and increased operating costs occurred in spite of an economy move which resulted in centralizing virtually all the executive departments in Indianapolis and other economies during the last year.

Old Time Fan That Uses Gas as Fuel

Fans for cooling fired with gas are not only unique and rare but nevertheless there are gas fans in existence.

One of these is at the Cathage Gas Company, this company having owned the gas fan since 1909.

John Jenkins, veteran superintendent of the Carthage company, who on August 16 of this year celebrated his twenty-sixth anniversary with the Carthage Gas Company, remembers that the fan whose power is gas was purchased by the old company which owned the Carthage Gas Company. This was one year prior to the time the Doherty organization purchased the Carthage Gas Company from J. S. Connelly and associates. Mr. Connelly, who was not only manager of the Carthage company but other gas distributing companies in different sections of the country at that time, purchased a number of gas fans. There was one in Chetopa and Bartlett, Kans., one in Shreveport, La., and another in Marshall, Texas.

In recent years the Carthage Gas Company attracted a great deal of interest in the gas fan by placing it in the display window and operating it at various times. They have asked the people of Carthage to guess what fuel is used for power. Many people guessed gasoline, electricity and other fuels but seldom did anyone guess that it was powered by gas.

According to Ralph Ford, manager of the Carthage Gas Company, the fan has no identification as to manufacture but Mr. Jenkins believes it was purchased from an organization known as the Welsbach Company.

Mr. Ford, in attempting to describe the contraption as to how it works, says that it would be more than a job for a Philadelphia lawyer. Ford states that when you light the burner in the jacket around the brass cylinder the fan starts to move up and down, transmitting this motion to two rods in the cylinder housing, which are connected to the connecting rods to the drive shaft by means of a 2-inch disc in such a manner that the up and down movement of the cylinder makes the disc rotate. It takes only a few seconds to start the fan when the burner is lit and the fan really works.

Another Large Gas Well

The seventeenth natural gas well was recently brought in on the D. W. Parish farm near Phelps, N. Y., a rapidly growing field, at a depth of 1100 feet. This well gauged 18,990,000 feet daily which makes it the second largest in the field.

New Gas Well Drilled in Indiana

A 3,300,000-foot gas well has been drilled in near Petersburg, Ind., by Claude Noble, independent gas operator of Princeton, Ind. This is one of the largest in Indiana.

Theft of Gas Punished by Jail Sentence

The theft of gas from the Gary, (Ind.) Heat, Light and Water Co., has drawn the first jail sentence in that section, and so far as can be learned, the first in Indiana. John Mulberry was sentenced to serve thirty days. He was found guilty in city court of destroying property of the utility in piping around the meter. He was fined also $5 and costs. Mulberry at first demanded a jury trial, but withdrew the request.

Minnesota Natural Gas Line to Be Constructed

The Minnesota Northern Natural Gas Co., has made provisions for a natural gas distribution system at Farmington, Minn., which will cost about $25,000. Charles S. Lewis is to be in charge of local construction.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published monthly at East Stroudsburg. Pa., for October, 1933.

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the Manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation) etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Gas Journal, Inc., 53 Park Place, New York City; Editor, H. M. Riley, 53 Park Place, New York City; Managing Editor, none; Business Manager, S. G. Krake, 53 Park Place, New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) S. G. Krake, 53 Park Place, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

S. G. KRAKE,
Business Manager.

Sworn to and subscribed before me this 11th day of October, 1933.

(Seal) ROZELLA BENNETT.

(My commission expires March 30, 1935.)

All sizes up to 3,400 cu. ft. capacity

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Diaphragms
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LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

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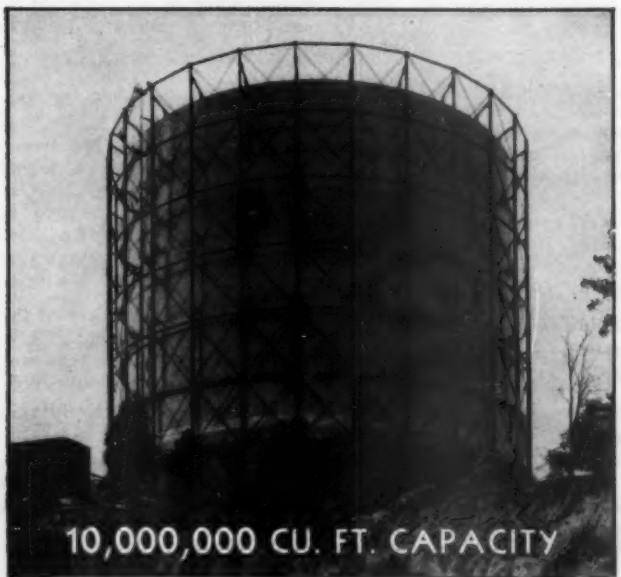

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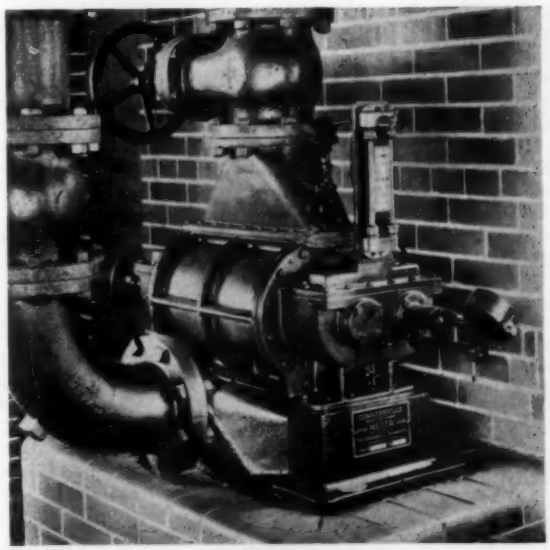

Small size Connersville Meter measuring natural gas to engine in large plant which pumps coke oven gas up to line pressure. The Meter handles about 25,000 cu. ft. per hour, at pressures which vary from 6 to 30 lbs.

Advantages of this type of Meter are briefly summarized, as follows:

1. No danger of collapsing Meter due to suction of the gas engine;
2. Accurate and fool-proof—easily read—consumption recorded hourly;
3. Years of trouble-free service insured by its sturdy construction;
4. Impossible to get out of adjustment—displacement machined in;
5. Low operating differential, and minimum maintenance expense.

It will be a pleasure to consult with you on your requirements. Years of experience in this field qualify us to advise you. Estimates without obligation. Address our nearest sales office.

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CONNERSVILLE, INDIANA

NEW YORK CHICAGO ST. LOUIS
PITTSBURGH DETROIT
POTTSTOWN, PA. LOS ANGELES
BELMONT, MASS SAN FRANCISCO

Personals

Miss R. Babette Eiseman, a graduate of the University of Pennsylvania, has been appointed consultant to the recently established Kitchen Planning Headquarters of the Philadelphia Gas Works Co.

Following her graduation in 1928, with the degree of Bachelor of Fine Arts, Miss Eiseman was employed by the University as an instructor in interior decorating. On leaving this position, she was for two years in charge of the designing and retail decorating department of Kayser and Allman, furniture dealers of Philadelphia. In 1931 she became associated with Francis T. Chambers, Jr., of Philadelphia, as an interior decorator and designer of reproduction furniture, continuing in that capacity until appointed to her present position.

Miss Eiseman states that an average of from 75 to 100 people call to inspect the model kitchens each day, and there are usually about a dozen requests each day for the kitchen planning service which is provided without charge.

John Gaillard, mechanical engineer on the staff of the American Standards Association, has just been awarded the degree of Doctor of Technical Science by the Technische Hoogeschool (Institute of Technology) of Delft, Holland, where he was graduated as a mechanical engineer before he moved to the United States and became an American citizen.

The award followed the submission of a thesis entitled "The Fundamentals of Industrial Standardization and Its Practical Application, Especially in the Mechanical Field." The thesis, among other things, traces the development of standardization in the course of human history, analyzes its essential functions, formulates a general definition of standardization, discusses the extent of its present application in the United States, and reviews the organization of standardization work in a manufacturing concern in the mechanical industry.

Olin Calvin, associated with Texas-Louisiana Power Co., at Breckenridge, Tex., is now located at Ranger, Tex., as local manager for the same company.

A. E. Bradshaw, executive vice-president and a director of the First National Bank and Trust Co., Tulsa, Okla., has resigned to become the new president of the Oklahoma Natural Gas Corp. Mr. Bradshaw, who was named receiver for the company by Federal Judge Franklin E. Kennamer, following the recent prolonged litigation, also becomes a director of the corporation and a member of the finance committee. **Robert W. Hendee,** former president, becomes vice-president and will relinquish his director's seat to Mr. Bradshaw. **Frank E. Kistler,** chairman of the board, who has submitted his resignation, will become chairman of the finance committee, which position he held prior to becoming chairman of the board. As chairman of the finance committee, Mr. Kistler will remain on the board of directors.

Robert B. Ingle has been appointed manager of the Macon (Ga.) Gas Light Company, succeeding E. C. Werba, who will in the future devote his entire time to his duties as assistant to E. H. Stern, eastern division manager for the utilities of which the Macon gas company is a unit. Mr. Ingle, who was formerly manager of the Key West, Fla., gas properties of the company, is to be succeeded there by **B. R. Roberts,** it is announced.

Frank R. Coates, head of the oil and natural gas division of Henry L. Doherty and Company, a director of Cities Service Company and former president of the Toledo Edison Company, has been commissioned a colonel on the staff of Governor Ruby Laffoon of Kentucky.

B. C. Adams, vice-president and general manager of the Gas Service Co., Kansas City, Mo., suffered a broken arm and other injuries recently when the plane in which he was making a business trip nosed over in a forced landing at Stratford, Tex. Mr. Adams was confined to an Amarillo hospital for several days.

Harold C. Cannon, Supervisor of Advertising, has been appointed chairman of the window and store display committee of the Commercial Section of the American Gas Association for the coming year.

The appointment was made by N. T. Sellman, newly-elected chairman of the Commercial Section.

Dr. H. J. Rose, a senior fellow of Mellon Institute of Industrial Research, has been elected chairman of the Gas and Fuel Division of the American Chemical Society for the year 1933-34. This honor has come to Dr. Rose in recognition of his productive research on solid fuels.

Dr. Rose is the author of numerous scientific and technical articles, which have been published in this country and abroad, and he has many U. S. and foreign patents in his name. His principal investigations have related to by-product coke technology, coal classification and anthracite.

At the recent national meeting of the American Chemical Society, Dr. Rose presented a paper on coal classification, which reported the progress that has been made in this important subject during the past 25 years. He is chairman of the American Standards Association committee on the scientific classification of coal.

Richard G. Soper, vice-president of the Dallas Gas Co., Dallas, Tex., has been elected president of that utility, succeeding the late Henry G. Morris, who died August 17th.

Mr. Soper has served the company for 25 years in various capacities. For several years he was superintendent and later became secretary. During the last five years he has served as vice-president and was closely associated with Mr. Morris in the administration of the affairs of the company.

Mr. L. A. Bickel, who has worked with Mr. Soper for the past nine years, was elected secretary.

Mr. Soper was born in Detroit and came to Dallas in 1909 one year before natural gas came into use in Dallas and was active in the development of natural gas there.

His first work with a utility company was with the Pontiac Light Co., Pontiac, Mich. He was later with the Jackson Gas Co., Jackson, Mich.

Hugh L. Rusch, has been elected Vice-President of the Northern Pump Company, Minneapolis, Minn., and appointed Eastern Sales Manager. Mr. Rusch was formerly Supervisor of the Technical Data Section and of the Performance Report Section with the Johns-Manville Corporation.

C. Patrick Johnson, superintendent of the Puget Sound Power & Light Co.'s gas department at Bellingham, Wash., is now making headquarters at the company's Seattle office as an assistant to S. P. MacFadden, vice-president in charge of sales.

Case S. Green, manager of the Iroquois Gas Co., Springville, N. Y., has resigned from that position. Mr. Green gave 37 years of active service, which began in 1896 with the Springville Gas Co., an organization which merged in 1910 with the National Fuel Co., and later was acquired by the Iroquois Gas Company.

C. G. Rathe, formerly manager of the Branford branch, Connecticut Light & Power Co., has been named manager of the Rockville office, Rockville-Willimantic Lighting Co., which operates a gas plant in Rockville, Conn.

Robert Naylor has been appointed manager of the Conrad, Mont., district of Northwest Utilities Co. service, succeeding R. W. Petter, resigned.

Maurice Eppe has been placed in charge of the company's Valier office.

Robert Ingle, for the past two years manager of the Key West Gas Co., Key West, Fla., has been appointed manager of the Macon Gas Co., Macon, Ga.

Robert Roberts, superintendent of the Key West Gas Company, will act as manager until Mr. Ingle's successor is appointed there, it was announced.

HEATING BUNKER "C" OIL

for carburetting gas requires high pressure and high temperature.

ANDALE BOWED TUBE HEATERS

remain tight and are easily cleaned. These are the requirements for continuous satisfactory operation.

ANDALE COMPANY

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PHILADELPHIA

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of

Standard Gas and Electric Company

231 South La Salle Street, Chicago

New York Pittsburgh San Francisco

STAINLESS STEELS STAINLESS STEELS STAINLESS STEELS

STAINLESS STEELS STAINLESS STEELS

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American Gas Journal
53 Park Place, New York

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Name ..... Position .....

Address .....

Jessie M. Read, for some years the Director of Home Service, Consumers' Gas Company of Toronto, and who assisted much in bringing that company's home service work to a high state of efficiency, was recently married and has retired from the service.

Helen Bates, Toronto, has been appointed by the Consumers' Gas Company of Toronto to the position of Home Service Director, left vacant by the retirement of Miss Jessie Read.

Miss Bates is well known for her highly efficient demonstrations in the art of home service and her public appearance as director of the local company's lecture work will be welcome news to many Toronto housewives.

Miss Bates wil be assisted by **Miss Ruth Onley.**

Thomas Gray, manager of the Public Service Company at Fort Collins, Colorado, was recently elected president of the Chamber of Commerce in that city.

Charles R. Prichard, vice president of the Lynn (Mass.) Gas & Electric Co., has been elected a vice-president of the Lynn Chamber of Commerce.

Frederick S. Chamberlain, for many years vice-president of the New Britain Gas Light Company, New Britain, Conn., has been elected president of that company to succeed Andrew J. Sloper, who died June 2nd.

F. M. Travis, a director of the company, replaces Mr. Chamberlain as vice-president.

L. O. Ripley, of Wichita, Kans., for many years vice-president and general manager of the Kansas Gas & Electric Co., has been elected president of that company. Mr. Ripley has been identified with the utility business in Wichita for nearly 25 years.

John A. McCue, manager of the Central Arizona Light & Power Co., office in Chandler, Ariz., has been transferred to the office in Temple. Mr. McCue has been prominent in civic affairs, being president of the Chandler Chamber of Commerce.

Tom Frost, of the Buckeye Light & Power Company of Buckeye, Ariz., is taking Mr. McCue's place.

Obituary

THOMAS W. STONE

Mr. Thomas W. Stone, aged 55, vice-president and general manager of the Western Gas Construction Company, died Wednesday evening, September 27th, at 6:30 o'clock at the Methodist Hospital, a few hours after suffering a stroke of apoplexy.

Mr. Stone was stricken as he reached the drive of his home, about 12:30 p. m. He never regained consciousness after he was stricken.

Mr. Stone went to Fort Wayne in 1902 to become employed as a draftsman for the Western Gas Construction Company. He became chief engineer in 1913. He was made vice-president of the firm in 1928 and became general manager of the plant in 1931.

He graduated in 1902 from Ohio State University with a degree of Mechanical Engineering, and was awarded membership in Sigma XI, scientific fraternity.

EDWIN H. HIGGINS

Edwin H. Higgins, 55 years old, secretary and manager of the California Oil and Gas Association, died October 23rd of a heart attack on the train while on the way to Chicago with a party of friends to attend the annual meeting of the American Petroleum Institute. Mr. Higgins was a resident of Los Angeles, a native of Florida, and a graduate of Lehigh University.

MICAJAH PRATT CLOUGH

Micajah Pratt Clough, president of the Lynn Gas & Electric Co., Lynn, Mass., since 1926, died at his home in Boston on October 27th. He was 83 years old.

Mr. Clough had been associated with the Lynn Gas & Electric Co. for more than 51 years. He was senior director and chairman of the board of trustees of the Essex Trust Co. of Lynn and of the Lynn Five Cents Saving Bank, and was senior director of the National Shawmut Bank of Boston. From 1904 until 1919 he was president of the Essex Trust Co.

Surviving are his wife, a son, and five daughters.

LOUIS J. DAVIS

Louis J. Davis, manager of the Mobile Gas Company, Mobile, Ala., for fifteen years died September 15th.

Mr. Davis was a native of Ohio, but had resided in Mobile for some time and was identified with the social and business life of the city for many years. He managed the gas company from 1906 to 1920.

He is survived by his widow and three daughters.

Heat Treating Units Synchronized by Conveyors

THREE large sized heat treating units consisting of hardening furnace, quench and annealing furnaces are combined by controls and conveyor systems into a single operating mechanism that is automatic and continuous both as to temperature control and heating and quenching time cycles. The furnaces are fired with gas burners and the whole is installed in the plant of the Spicer Manufacturing Company, Toledo, Ohio.

Treatment of the parts begins with loading the forgings upon steel trays and the trays on a platform in front of the hardening furnace. The trays are pushed through the furnace by a mechanical pusher and from this point the parts are discharged into a quenching tank, whence they are removed by means of an apron conveyor. The latter delivers the hardened forgings to a second platform and pusher, in front of the drawing furnace. During the time that the stock is being quenched, the carrier trays are pulled out of the hardening furnace and placed in position at the second furnace by means of a transfer conveyor. They are then reloaded and the forgings pushed through the draw furnace, and discharged to a pan conveyor delivering into tote boxes.

The trays are returned to the starting point on a tray return conveyor.

It will be seen from this outline of operations, that two heating processes are involved, with a series of six conveyors to carry on the work. At first glance it may seem a simple conveying problem, but account must be taken of the time element. The stock must remain in the furnace for a variable time, during which the conveyors are stationary. Also, when the proper time arrives, the conveying system must be automatically set in motion so that the trays may be placed in position when needed in accordance with a predetermined cycle.

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TRADE NEWS

Victor-Acme Blowers

Bulletin 21-B16, illustrating and describing Victor-Acme blowers, has just been published by Roots-Connersville-Wilbraham, Connersville, Ind. The Victor-Acme line includes a complete range of blowers in the smaller capacities, up to seven lbs. pressure, or equivalent vacuums.

These blowers are offered in two types. The Type "SB" blowers suitable for lower pressures, are fitted with renewable bronze sleeve bearings and semi-steel timing gears, and the Type "AFS" blowers, recommended for continuous service at higher pressures, are fitted with heat-treated steel gears and fully sealed anti-friction bearings.

Page one of the new bulletin lists about thirty of the principal uses and applications; page two describes features of the construction, and illustrates the two types in various driving arrangements, including direct-coupled, single pulley, and V-belt; page three carries a table of net capacities at listed pressures and speeds covering the eighteen sizes in which the blowers are available, and page four shows several views of Victor-Acme installations.

Western Gas Construction Gets New Contract

The Western Gas Construction Co., makers of gas tanks, has been awarded the contract for 53 more large tanks to be installed in the plant of the Centlivre Brewing Corporation at Fort Wayne, Ind.

B. F. Goodrich Company Appoints New Store Manager

Appointment of N. H. Biggers as manager of the Austin, Texas, store of Goodrich Silvertown Inc. retail division of The B. F. Goodrich Company is announced by S. B. Robertson, Goodrich vice president. Biggers succeeds W. G. Cater, who has been assigned to other duties.

Stacey Brothers to Erect Large Gas Holder at Omaha

The Metropolitan Utilities District, Omaha, Nebr., has awarded to The Stacey Brothers Gas Construction Co., Cincinnati, O., contract covering the erection complete of an 8000 MCF gas holder.

This holder will be approximately 241 ft. in diameter, weighing approximately 3600 tons. The fabrication of the material is being started at the Cincinnati plant of the contractor and excavation for the foundation has already been completed.

This large holder, together with other improvements to the gas plant, is being constructed under 30 per cent government grant, this being one of the first projects in the State of Nebraska to receive governmental approval.

Steel and Tubes, Inc., Makes Changes in Personnel

Steel and Tubes, Inc., Cleveland, O., announces the following changes in personnel:

Mr. A. V. Grove has been transferred from the Cleveland Office to the Chicago Office in the Sales Department.

Mr. R. E. Doyle is now sales correspondent in the Cleveland Office.

Mr. J. F. Keeler is now sales engineer with headquarters at the Cleveland Office.

New Brown Thermometer and Pressure Gauge Catalog No. 6702

The Brown Instrument Company, Philadelphia, Pa., has just published a new catalog featuring the new Brown Thermometer and Pressure Gauge line. The new Brown Thermometers and Pressure Gauges are available in indicating, recording and controlling types and have many new and improved features such as:

Universal case.
Electric chart drive.
Automatic pen release.
Combination door handle and lock.
Toggle switch for chart drive, etc., that are standard without extra cost.

The new Brown Automatic Control Thermometer and Pressure Gauges are operated by mercury-in-glass switches thus eliminating relays and exposed contacts. No power required from helix for control.

A copy will be sent promptly to any industrial executive requesting same from The Brown Instrument Company, Philadelphia, Pa. Persons writing for a copy of this new catalog should ask for Catalog No. 6702.

Mueller Company to Have New Plant in Los Angeles

A new $250,000 plant for Mueller Company, located in the Hostetter industrial district of Los Angeles, will swing into production on December 1. The plant, which will manufacture plumbing, water and gas valves, has been erected to serve the Pacific Southwest, Hawaiian and Oriental trade.

Mueller Company maintains sales branches in several leading American cities, but manufacturing plants are located only at Decatur, Ill., in Ontario, Canada, and now in Los Angeles. The factory site purchased by the company in the Hostetter industrial district is regarded as sufficient area to permit the eventual doubling of the plant's size.

Goes With National Meter Co.

J. A. McBride, assistant engineer of gas distribution, United Engineers & Constructors, Inc., has resigned to become sales engineer for the National Meter Co. Mr. McBride, who has become well known in the gas industry since 1924, will represent the meter company nationally.

Following his graduation from the Mechanical Engineering Department of Lehigh University in 1924, he entered U. G. I. employ as cadet engineer in the distribution department of the Philadelphia Gas Works, where much of his time was spent on the difficult work incidental to the construction of the Broad Street subway. In 1928 he was transferred to the gas distribution department of The U. G. I. Contracting Co. Since the formation of United Engineers & Constructors, Inc., he has been assistant engineer of gas distribution. In that capacity he has handled engineering and sales work on many difficult and unusual pipe-line construction jobs in various sections of this country.

New Tag Certified Hydrometers

The C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., announces the development of the new line of Tag Certified Hydrometers with many entirely new features.

These instruments are supplied in plain and combined forms and are superior to the older models in accuracy, convenience and construction.

The Metal Thermometer Scale the first ever developed for the Hydrometer is much longer and the wide graduations allow temperature determinations to be made as close as ±0.25°F., which is important, since a variation of ±1°F. can introduce an error of as much as 0.2° A.P.I. in gravity readings.

New Heater for Breaking Emulsions of Water in Crude Oil

The National Radiator Corporation, Johnstown, Pa., has issued literature describing a new type of heater for breaking emulsions of water in crude oil. The heater has a number of noteworthy features, such as, readily increasable capacity, adaptability to various methods of treating emulsions, highly efficient heat transfer, and extreme simplicity of construction. A research report that tells about the construction and use of this heater is available on request.

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Oil Gas Plants — "Refractory Screen" Process for Base — Standby or Peak Loads — On Existing or New Water Gas Sets Low or High B. T. U. Gas

Koppers Company Makes New Appointments

At a meeting of the Koppers Company on October 23rd, C. D. Marshall was elected Chairman of the Executive Committee; H. B. Rust, Chairman of the Board; W. F. Rust, Vice-Chairman; John T. Tierney, President, and J. P. Williams, Jr., Vice-President.

Mr. Tierney has been associated with the Koppers interests for the past 17 years. Mr. Tierney served his apprenticeship with the Laclede Gas Light Company of St. Louis. He left that company to join the Koppers interests as superintendent of the Seaboard By-Product Coke Plant. Mr. Tierney for a number of years has been Vice-President of the Koppers Gas and Coke Company with his offices in Pittsburgh, and is a director of the principal subsidiary companies of the Koppers group.

J. P. Williams, Jr., was first associated with The Koppers Company as a mining engineer and Manager of the Melcroft Coal Company. For many years he has been in charge of the mining operations of The Koppers Company and is President of the Koppers Coal and Transportation Company.

Foxboro Issues Catalog on "Pressure Instruments"

Foxboro Company, Foxboro, Mass., have issued a 40 page catalog, No. 185, titled "Pressure Instruments," in which is illustrated and described their line of recording, controlling and indicating instruments for all purposes, as well as showing charts, gauge boards and accessories. The operation of the various instruments is described, and most illustrations show the working parts.

Electrolux Making Alterations at Evansville

Extension and alterations at the Electrolux Refrigerator unit of Servel, Inc., at Evansville, Indiana, were reported on November 1st in order to meet 1934 production requirements brought about by the growing popularity of the new air-cooled gas refrigerator, F. E. Sellman, vice-president, announced recently.

While the improvements constitute a modest program and are designed to meet actual needs, Mr. Sellman said it might be regarded as an optimistic sign on the industrial horizon.

"Plans are now under way for extension and alterations in the company's plant to provide for the larger output provided for in our 1934 program which is under NRA regulations," Mr. Sellman stated. "We hope to complete the new arrangements by the middle of December so that everything will then be in readiness to begin actual productive operations in all departments.

"Under the new arrangements, the company will probably employ more people in 1934 than in previous years.

"The plans do not provide for the construction of new large structures, but several small buildings will be added to the plant. In many of the departments where the air-cooled gas refrigerators are manufactured, the changes will be extensive, however. The management has great confidence in its products and is going forward in investing considerable money, in addition to plant equipment.

"Departments that are not affected by alterations or extensions will begin operations early in November, following inventory taking, but in those departments where extensive changes are planned, actual productive operations will be delayed until reconstruction work is completed.

"Servel, Inc., manufactures both gas and electric refrigerators, the gas refrigerators being marketed through gas companies throughout the country under the name of Electrolux. The introduction of the air-cooled type of Electrolux refrigerator in April of this present year has resulted in a large increase in the volume of Servel business."

McLeod & Henry Issue New Bulletin

McLeod & Henry Co., Troy, N. Y., manufacturers of Carbex Silicin-Carbide Super-Refractories, have issued a four-page illustrated bulletin telling how to line water-gas generator furnaces to reduce the cost of declinkering, cleaning and maintenance. It contains tables and data of value to those in charge of gas production. Copies may be had by addressing McLeod & Henry Co., and asking for bulletin G-147.

Link-Belt Issues New Data Book

Link-Belt Company, 2410 W. 18th St., Chicago, has just completed a 128-page Data Book No. 1289 on its Caldwell Helicoid and Sectional-Flight Screw Conveyor. The book is copiously illustrated, contains engineering data and list prices, and is said to be the most complete treatise ever published on the subject. A copy of it may be had by addressing the company on business letterhead.

Heads Stove Co.

F. W. Waterman, Jr., formerly engineer of manufacturing, has been elected president of the Century Stove & Manufacturing Co., Johnstown, Pa., succeeding the late John H. Waters.

Gets Big Gas Well

The Ohio Oil Company recently brought in a 50 million cubic foot gas well on the Allen Lake structure, Wyoming, near Medicine Bow. It is one of the largest completed in that locality.

Henry L. Doherty Wins Suit Against District Landowners Trust

Judge Robert W. Steele, in the district court, Denver, Colorado, awarded Henry L. Doherty, head of the Cities Service Company, $306,786.29 against the District Landowners Trust. The amount named covers irrigation rights in Adams and Arapahoe counties, Colorado, and a promissory note, with interest dated May, 1924. The original amount was $225,000.

New Gas Well Brought In

Harry N. Bell of Chicago, independent gas and oil producer, has brought in a 4,000,000 gas well on the Shea brothers lease east of Petersburg, Ind., the largest gas well drilled in that section in the last three years. Ferd P. Veeck, receiver for the Craig heirs lease, will start his No. 6 well 675 feet south of the Shea well at once.

Air Heater Fuel

IN the past few years the development of new drying and baking processes, necessity for uniform products, increased production and lowering fuel costs per unit of material produced, have all had an important bearing on the selection of efficient equipment for low temperature heating operations. These various operations include such processes as wire baking, baking cores and molds, rug drying, baking various enamels, paints, papers and lacquers, straight water drying of steel barrels after testing preliminary to painting, armature baking, carbon baking and many other drying operations. In the past the source of heat has been from such fuels as coal, coke, oil or indirectly by use of steam. These are being rapidly replaced by gas fuel due to the demand for uniform work of a high quality, for increased production by decreasing the time required for heating, and the reduction of heating cost per unit of work produced.

These gas-fired air heaters have the advantage of higher efficiencies than heaters using other fuels; they are adaptable to high rates of recirculation, clean heat, and quick heating. They are automatically controlled, and are equipped with safety pilots. They have four-way connections, heater jacketed with incoming air insuring low shell temperature, range of temperature up to 1000 deg. F., and furthermore, occupy small floor space, are easily installed, require practically no maintenance, and very little attention, and are efficient in operation.—*American Gas Association.*

Only a Few Copies Available

Salesmen of gas appliances can increase their sales when they have a thorough working knowledge of the functions and uses of each appliance.

This can be secured in a handy pocket-size edition of "Domestic Gas Appliances" by A. M. Apmann.

So that every salesman may have access to this valuable information, a special buckram bound edition is now available at a cost of only $1.00 each.

Though containing much technical information on every type of domestic gas appliance, this book is written so simply that the average salesman, whether technically trained or not, will find it an indispensable sales aid.

That ever-present question of comparative fuel costs and efficiencies is covered very thoroughly in this handy little volume. This data alone is worth the cost of the book.

Read over the contents—Where can such a fund of information on gas appliances be secured at so small a cost?

"Intended to supply the gas salesman with enough information to let him know his products and their uses.

"Although intended for sales purposes the book contains considerable information of a technical nature. Chapters are included on fuel characteristics, fuel prices, and comparative fuel costs, which include statements of efficiencies and methods of estimating. Pipe capacities, meters and gas orifices are treated in such a way that the principles and operation are made clear. Much space is devoted to descriptions of existing types of gas-fired furnaces, boilers and radiant heaters; to laundry equipment, hot water heaters and to the gas refrigerators. A series of questions and problems is included at the back.

"A very useful book, and one that should be of interest to all who deal with domestic gas utilization."

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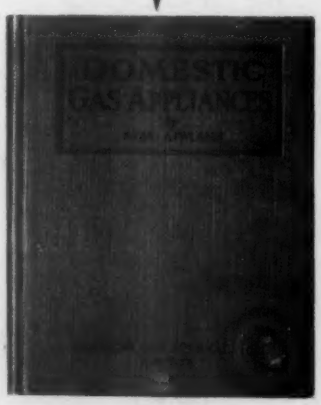

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